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### CENTENARY OF STEAM NAVIGATION

The Fulton Centennial Commission met recently in the rooms of the Board of Trade and Transportation, New York, to outline a general plan for the observance of the centenary of steam navigation which occurs in 1907. There were present Aaron Vanderbilt, J. H. Kennedy, William McCarroll, Arthur English, Louis I. Romaine, Isaac Stern and Rear Admiral George W. Melville. Mr. Gustav Schwab, who could not be present, expressed himself in writing as follows:

"I am firmly of the conviction that we should not propose the expenditure of a large sum of money in some ephemeral and fleeting show, such as a water or land parade, or fireworks or anything of that description, but that we should suggest to the mayor some plan for a lasting and permanent memorial that would serve to transmit to future generations a fitting and living remembrance of the birth of the greatest revolution in water transportation that has ever taken place. I do not think that such a memorial could take a better shape than that of a monumental water gate, the whole surmounted by an arch, with steps spreading down to the water, at the Battery. Such a monument approach to this great metropolis, soon to be the mightiest city of the world, is, I think, needed and would be most appropriate, to serve as an entrance gate to the city for her distinguished guests from foreign shores. I believe that the Municipal Art Society, or some kindred organization, has already planned or suggested an improvement of this character, and I do not believe that a more fitting and more magnificent memorial could be devised to celebrate Fulton's invention. An active canvass among the business men and citizens of New York city should succeed without great difficulty in raising the sum necessary for the construction of such a monumental gateway."

Rear Admiral G. W. Melville stated that he believed it would be a good thing to adopt the suggestion of Mr. Schwab for a monumental arch and waterway if a proper site could be obtained, and suggested that a suitable land and water parade should be made features of the celebration; that the entire celebration should be limited to one week—starting promptly on Monday morning and concluding on Saturday night.

"To my mind, in the proposed commemoration of the first successful establishment of steam navigation, the controlling idea should be the educational one," said Mr.

Romaine. "Few people fully appreciate the enormous advance made in the methods of navigating the rivers, lakes and harbors of this and other countries, and of the high seas, since Robert Fulton's time. Here where the paddle wheels of the Clermont first broke the surface of the Hudson is the opportunity offered of presenting this great object lesson to millions of people.

"This presentation may be made of great historical interest, showing the evolution of steam-propelled craft from Fulton's Clermont to the 24,000-ton steamer of the present day, a procession of vessels upon the waters of the Hudson, unique in character, and beautiful as a great marine pageant amid most picturesque and suitable surroundings.

"The natural conditions of the shores of the Hudson river from the Weehawken ferry on the New Jersey side, and Seventy-second street on the New York side, for several miles northward, are such that magnificent viewpoints are to be had high above the river, from which literally millions of spectators may view such a scene. The greater part of the land on both sides of the river can be made available for this purpose, particularly as the shores on the New York side are embraced in the park department from 72nd street to 129th street, a distance of three miles, and further north along the Boulevard Lafayette and Fort Washington park; while the cliffs and palisades on the New Jersey shore offer exceptional advantages.

"Concerning the scope or character of the marine parade, the central idea, in my opinion, should be the importance of the steamer Clermont, not as a link in the chain of craft from the galleys of the Phoenicians to the modern battleships, but as the beginning of the steam era; for only in this way can the full importance of Robert Fulton's achievement be appreciated.

"Let the Clermont then lead the procession, a perfect facsimile of the vessel built by Fulton, then may follow other early steam craft; the first vessel to use steam on the Atlantic, the first steamer that navigated the great lakes, the first of the Mississippi boats and of other inland water steamers of this and other countries; the first harbor craft, the first propeller and the first warship propelled by steam, and so on through the various types to characteristic examples of the craft of the present day.

"Following this may be the strictly naval parade and there is no reason why this should not be the greatest

ever witnessed in any waters, fleets from every nation assembled in honor of the triumph of steam, and closed by the strongest and greatest fleet of warships over which the American flag has ever floated.

"Such a marine parade proceeding slowly, say six miles an hour, from opposite Weehawken to the extreme northern end of Manhattan island, a distance of about eight and a half miles, would cover the distance up and back in about three hours, and allowing for a length of the procession of five to six miles, a total of four hours would be required for its passage; not an unreasonably long time.

"Outside of the naval fleets I would certainly advocate the total elimination from such a parade of all craft not especially constructed or introduced to illustrate the history of steam navigation. No general parade of steamboats, yachts, or tug boats should mar the educational character and the beauty of the historical parade, or the power and grandeur of the naval review.

"A second holiday may witness a land parade of the various sailors from the naval squadrons. Such a land parade was one of the most interesting features of the Columbian celebration of 1892, and may be made so much larger and more imposing at this time, that it alone should be a great attraction. By starting the marine parade at, say 1 o'clock, ample time would be given for the multitude of visitors and spectators to place themselves on both sides of the Hudson and on board the countless boats to view the parade, and the show would be over by 5 p. m., while the land parade taking place at, say 11 o'clock the next morning, and lasting say two hours, would permit the hundreds of thousands of visitors from neighboring towns to return to their homes in the afternoon.

"As to the expenses of such a celebration it would be, outside of the erection of stands along the water front by the city, and banquets and entertainments to its distinguished guests, almost entirely confined to the cost of reproducing, either by new building or by alteration, the various craft to illustrate the progress in the different types of steam vessels.

"As the vessels, for the most part, would be very small and could be lightly and cheaply constructed, or could be fitted up to existing hulls and machinery at small expense, a comparatively small sum, probably a half million dollars, would suffice, perhaps less.

"Some of our sister states, either bordering on the ocean or bays of the Atlantic or Pacific, or on the great lakes or inland rivers, may wish to be represented by some distinctive or peculiar type of steam craft, and which they may furnish for the parade. Such steamers carrying say the governor and staff of its state, who during their stay would be the city's guests, would prove a popular feature and bring thousands of the citizens of the state thus represented to the celebration.

"The suggestion has been made that a maritime or shipping exposition should be organized to open, say the day following the Fulton parade, and to last, say three or four months, to November or December. Such an exposition was held in Liverpool in 1886 and attracted much attention, and at this time a much more attractive and complete exhibition of maritime objects and inventions could be made.

"Such an exhibition would attract, of course, an enormous gathering of visitors from all parts of the country, and it is a question, often before discussed, whether New York city wishes to add to its already busy and crowded life a population of many thousands for several months.

"The suggestions I have heard made here by the different members of the committee, some of them, I think, are more valuable than any I have made. The idea of a permanent, monumental waterway is splendid and would fitly commemorate the occasion and be an appropriate tribute to Robert Fulton."

Mr. English approved the views of Mr. Romaine, and

thought his suggestions should be embodied in the report of the committee as well as the suggestion of Mr. Schwab, for a monumental arch and waterway. Continuing, Mr. English said:

"This country has given to the world a great many interesting ideas. We have shown the Old World how to talk for 2,000 miles over a wire; how to write 2,000 miles over a wire; we have produced the steamship, which has revolutionized water transportation of passengers and freight; we have produced the sewing machine; we have produced the cotton gin; in fact we have taught the Old World a great many things. Now, I think the United States, and particularly New York, should establish at this gateway of the New World a permanent, memorial museum in which would be exhibited the features in which the United States has led the world. I believe with Mr. Schwab that there should be a permanent monument of the first application of steam to the propulsion of boats. New York will never stop at the question of expense if the object to be accomplished is worthy, and stands for the genius of these United States."

Mr. McCarroll also indorsed the suggestions made by Messrs. Schwab and Romaine, adding one that a maritime congress be held for one day to which should be invited eminent men connected with the world's merchant marine.

It was decided that the various suggestions advanced should be arranged in a systematic report, which is to be presented to the Fulton centennial commission, after reconsideration by the committee on plan and scope at a meeting to be held in the near future.

On the commission, in addition to the members of the committee which met yesterday, are Thomas Clyde, Barr Perree, Frank S. Gardner, George F. Gregory, W. L. Guillaudeau, Colgate Hoyt, Hugh Kelly, Charles H. Loring, Herman A. Metz, Herbert L. Satterlee, Louis Stewart, Oscar S. Straus, W. E. Woolley, James A. Wright.

### TESTING ARMOR OF TENNESSEE CLASS

An account has just been given by the naval bureau of ordnance of an interesting experiment recently conducted at the naval proving grounds at Indian Head in continuation of the series of experiments begun last March to determine the resisting power of the Tennessee class of armored cruiser under the attack of projectiles loaded with various kinds of explosives. The accounts say:

"The 6 and 8-in. guns were used in the test, the striking velocity of the projectiles being those corresponding to ranges of from 3,000 to 5,000 yards. The target was a structure built in exact imitation of the side of the Tennessee, with all decks and bulkheads complete. The results were on the whole extremely satisfactory as regards the design of the ship. The damage done by the bursting shells was within the compartment where the explosion took place, and while the damage to both personnel and material within the compartment would undoubtedly have been very great, the ship as a whole would have been intact at the conclusion of the firing. As a final test a 12-in. shell was exploded within a closed compartment just above the armored deck. The local effect of this was considerable, but the armored deck was not penetrated."

Twenty-three British warships originally costing \$8,000,000 were sold at public auction at Portsmouth recently for \$375,000, affording a concrete example of the rapidity with which warships may become obsolete.

The steamship Juniata, which was damaged in collision with the schooner Harvard Palmer, will be repaired at the yard of the Maryland Steel Co., Sparrow's Point, Md.

## MARITIME TRADE OF TURKEY

A report drawn up by the commercial expert attached to the British Consulate-General in Constantinople gives particulars of the maritime trade of Turkey in the year 1903-1904 (March 14, 1903, to March 13, 1904). The total tonnage engaged in this trade in that year exceeded by about 9½ percent that of any preceding year, and the progress made in the last two years amounts to nearly 21 percent. The percentage of each of the participating maritime nations remains, however, for the most part the same, with two exceptions, namely, that of France, which is a little greater, and that of Turkey, which has suffered the regular decrease (2 percent per annum) which has been going on for several years past. The shares of the different flags in the year under review were:

	Sail. Reg. tons.	Steam. Reg. tons.
Great Britain .....	10,500	15,090,637
Germany .....	.....	1,770,580
Austria-Hungary .....	3,889	7,379,850
Belgium .....	.....	455,638
Denmark .....	.....	109,871
Spain .....	.....	125,318
France .....	138,559	2,961,990
Greece .....	310,472	5,920,063
Holland .....	.....	515,475
Italy .....	41,540	3,844,405
Montenegro .....	14,416	13,114
Turkey .....	2,055,823	4,278,417
Bulgaria .....	2,522	244,682
Egypt .....	2,678	92,669
Roumania .....	4,149	187,968
Russia .....	1,906	3,326,851
Sweden and Norway .....	.....	396,256
Total (including other countries) .....	2,605,704	40,713,989

It is not possible, from the above figures to ascertain the quantities of cargo landed from and shipped on board the vessels represented in the list, as probably nearly half of them arrived or sailed in ballast. The next table shows the shares of the different flags in the year 1902-03 and (for the purpose of comparison) the figures for the year 1873-4:

	1873-4.		1902-3.	
	Steam. Reg. tons.	Sail. Reg. tons.	Steam. Reg. tons.	Sail. Reg. tons.
Great Britain.....	2,613,041	378,649	13,513,860	11,065
Germany.....	13,402	33,140	1,632,782	11
Austria-Hungary...	2,593,644	490,024	6,776,207	5,385
Belgium.....	92,035	1,320	394,254	.....
France.....	1,717,245	6,220	2,475,002	101,378
Greece.....	7,270	1,362,168	5,163,099	333,598
Holland.....	28,764	2,572	413,734	.....
Italy.....	327,786	905,645	3,543,156	44,487
Turkey.....	1,811,070	3,557,783	4,823,149	1,988,930
Russia.....	1,142,739	276,848	3,026,696	1,223
Sweden and Norway	47,918	57,783	310,404	.....

Total (including other countries)..... 10,401,529 7,111,079 42,581,235 2,516,654

The features of the shipping traffic in the Levant have changed but very little in late years; but, on the one hand, the Court Line appears to be gradually going out of existence—eleven of its boats being already sold, and a very precarious coasting service being maintained by the remaining five—and, on the other hand, the Roumanian maritime service has been extended, so that now, in connection with the bi-weekly line between Constanza and Constantinople, a voyage to the Piraeus and one to Smyrna is undertaken alternately, and when another steamer now nearing completion is delivered the service will be extended to Alexandria. The cargo-boat line from Galatz and Braila (or from Sulina and Constanza) to

Rotterdam now, however, works irregularly on account of the falling off in the supply of Westphalian coal as return freight.

## BIDS FOR MACHINE TOOLS

Washington, Oct. 9.—The bureau of supplies and accounts of the navy department will within the next few weeks open bids for a considerable number of supply and equipment items for the various branches of the service. On Tuesday, Oct. 10, bids will be opened for machine tools, etc., called for by requisitions from the bureaus of steam engineering, equipment and yards and docks, for delivery at the navy yards at Boston, Mass., New York city, League Island, Pa., and Pensacola, Fla. The items include one 70 ton 36 ft. railroad scale, one rock-crushing plant, one No. 1 horizontal boring and drilling machine, one 30 in. by 27 ft. bed triple-gear engine lathe, one lathe, engine screw cutting 18 in., 12 ft. length of bed, one emery wheel grinding lathe, one engine lathe, screw cutting 24 in., one belt-driven wood lathe, one engraving machine, one No. 2-A Universal milling machine, one vertical drill press to drill not less than 24 in., one single-spindle sensitive drill press 13 in. swing, one belt driven semi-automatic machine for making screw glands for surface condensers, one magnetic metal separator, one hydraulic shaft-straightening machine to have a capacity for straightening shafts up to 10 in. diameter and 30 ft. length, one hydraulic shaft-straightening machine to have a capacity for straightening shafts up to 3 in., in diameter and 12 ft. length, one belt driven hand saw, one hand planer and joiner, one single frame steam hammer, size 800 lbs., one hydraulic pipe-bending machine, one pipe-bending machine to be operated by a handwheel, one belt driven horizontal drilling and boring machine, one 37 in. vertical boring and turning mill, one belt driven universal radial drill having radius of 60 in., and one 6 ft., universal radial drill.

Oct. 17 bids will be opened for a considerable quantity of machines, machine tools, etc., delivery of most of the items to be made at navy yards on the Pacific coast. Among the items are one air hoist 10 in. diameter, one air hoist 7 in. diameter, one air hoist 4 in. diameter of cylinder, one cast iron sheave 47 in. diameter, three cast iron sheaves 36 in. outside diameter, four cast iron double sheaves 12 in. outside diameter, two cast iron sheaves 12 in. outside diameter, 500 sq. ft. expanded metal fabric, 31,000 lbs. structural steel crane rails, three Hyde steam windlasses, one two-spindle centering machine, one two motor three ton electric traveling hoist, 328,000 lbs. of mild-steel plates, one locomotive crane 10 tons capacity.

## LIVERPOOL SHIPPING LETTER

Liverpool, Oct. 2.—The Baltic freight conference which came into existence a few months ago has certainly realized all its ambitions in establishing minimum rates of freight. A circular just issued by the president emphatically declares that conference rates have in almost all cases been secured, that the entries now amount to 757 steamers and about 1,150,000 tons gross register, but urges that members should not relax their efforts to make the association a complete success, especially now that the moment is drawing nigh when much tonnage will be booked over the next Baltic season. The committee earnestly hope that owners will stand firm, so that the improvement in rates which the conference has been instrumental in bringing about, not only may be maintained but further strengthened. To insure this result as far as possible, the next meeting of the conference will be summoned for the latter end of October or the beginning of November.

The reports that have been current here and which may

have reached the United States of America, that an Anglo-Japanese shipping combine with a capital of \$25,000,000 is about to be formed turns out to be untrue. As showing, however, that something is being thought of in this direction, Sir Alfred Jones, the head of Messrs. Elder Dempster & Co., has stated that he has been approached with a view to forming a syndicate, having for its object the expansion of the shipping and trade of Japan, but so far as he is concerned nothing further has been done in the matter. As an observer of what was going on, he had long since paid special attention to Japan and China, and believed that the present opportunities for developing trade with these countries were immense. What his intentions were with regard to the Far Eastern trade, he declined to say, but the termination of the war offered an excellent opportunity for the exercise of enterprise and the investment of capital. Inquiries at the offices of the Nippon Yusen Kaisha Co. in this country have elicited the statement that nothing was known there of the rumored combine. But there is no telling what developments will be made in the Eastern trade in the immediate future. Doubtless the Nippon Yusen company will extend their European operations, but so far as Liverpool is concerned the Ocean Steamship Co., which was formed in 1865 by Mr. Alfred Holt, has a powerful fleet of steamers to the Far East. The North German Lloyd and the Hamburg-American lines also have numerous sailings. The White Star Line in the Far East has also a Pacific line.

At the time of writing a most graphic description of the blowing up of the steamer Chatham in the Suez canal which was sunk on Sept. 6 with 80 tons of dynamite on board, is published from the special correspondent of the *Daily Telegraph* at Port Said. At 9:50 on the morning of Tuesday, Sept. 28, the dynamite expert having charge of the arrangements switched on his battery, when instantly an immense column of water, sand and debris rose majestically into the air to a height of over 2,000 ft., accompanied by a distinct shock which was felt four miles away. A terrific report was heard some fifteen seconds later, and the time that elapsed from the rise of the column of water to its fall was 35 seconds. An examination showed that practically no damage was done to the railway permanent way, but the telegraph and telephone wires were blown down. A fissure of considerable extent and depth was torn in the Arabian bank of the canal, and both banks were strewn with debris. A buoy which lay close to the stern of the steamer was uninjured, and little damage had occurred to the fresh water canal. Thousands of fish, many of them over a yard in length, were found in the desert three or four hundred yards away. The whole of the water of the canal for a length of some 200 yards had apparently been lifted and thrown over the banks of the canal on either side. There was no explosive concussion noticed within three miles radius, and only the faintest sound of the explosion was heard in Port Said twelve miles away, the inhabitants of which port have now returned to their domiciles. Fortunately the steamer sank where the canal passes through the desert, the nearest buildings to it being the company's stations, one about three miles below it and the other about three and a half miles above. Lloyds agent at Port Said also reports that as a result of the explosion, the forepart of the steamer has entirely disappeared. What remains will be blown up afresh. The canal's Asiatic bank has been damaged, 250 by 70 yards being blown away. A hole 110 ft. deep has been made under the vessel. The debris is within a circle of 750 yards—plates, frames and machinery. Traffic in the canal will probably be restored within ten days.

An official message to Mr. J. W. Hughes, Liverpool, who is a director of the Suez Canal Co., says the traffic will be resumed in three or four days at the outside.

The United States consul in Liverpool, Mr. John L. Griffiths, has just furnished to his government an interesting report on strikes and other labor disputes in Great Britain. After pointing out that the number of disputes last year was 354 affecting 87,000 work people, he gives the returns showing that the number was far less than the annual average for the previous ten years, while the number of work people affected by these disputes last year was only about one-third of the annual average in the same contrasting period. Mr. Griffiths comments on these facts as follows: There are many unemployed in Great Britain at the present time, but misunderstandings between employers and employees seem to be diminishing, and to be more readily adjusted. Whether or not this is merely a passing phase of the labor situation in the United Kingdom or an indication of growing goodwill between the employers and the wage-earners can only be determined by future developments.

The August figures relating to the vessels added to and removed from the British Registry, which have just been published furnish some more or less interesting features. Altogether the gross tonnage of new registrations reached 93,593 tons, and the removals 68,097 tons, a very fair balance on the plus side thus being maintained. Out of 167 ships thus newly registered, 14 were purchased from foreigners, but on the other hand Britain sold no less than 51 vessels to her various neighbors, which leaves once more a good balance in her favor. Out of a total of 94,000 additional tonnage, no less than 84,000 referred to steel steamers, whereas out of the 68,000 old tonnage disposed of, only 32,000 had reference to this class of vessel. The feature of the table referring to the vessels whose registers have been closed is the record of a fairly large number as having been sold to Japan. The following list gives particulars of the steamers in question:

#### STEAMERS SOLD TO JAPAN.

Name.	Port of Registry.	When Built.	Gross Tons.
Grosmont, West Hartlepool.....		1899	2,840
Kolpino, Hull .....		1889	2,352
Loch Etive, Dundee .....		1886	2,148
Mazagan, Liverpool .....		1902	1,697
Vasma, Glasgow .....		1890	915
Vita, Glasgow .....		1890	915
Eugene Krohn, North Shields.....		1883	714
Kangra, Glasgow .....		1881	1,984
Sea Lion, Cork .....		1870	1,040
Argus, Melbourne .....		1888	2,792
Herald, Dunedin .....		1884	573
Rotokino, Dunedin .....		1890	2,064
Ban Sing Guan, Singapore.....		1886	801
Rockton, Sydney .....		1882	1,972

The Allan Line here have issued to their agents and shippers the following circular on their Glasgow-New York service: "The lease of our New York pier expires at this time, and we regret that we have been unable to arrange for its renewal, or to secure other suitable accommodation in New York. We are sorry, therefore, to announce that we must in the meantime suspend our New York service after the Numidian on Sept. 28. We trust that circumstances may permit of our resuming sailings between Glasgow and New York at no distant date. While the New York service is suspended, we are arranging to improve our Boston service, by which line, along with our fortnightly sailings to Portland, we can still offer good facilities every week for shipments to all points in the United States and Canada." In consequence of this decision of Messrs. Allan, the Anchor Line will have a



monopoly of the Glasgow to New York trade. They allege that the high berth charges at New York have caused them to take this course.

The great deal of talk which has been going on throughout Europe during the past week about the purchase of the Singapore docks turns out to be purchases by the government of the Straits Settlement and not the British Imperial Government. Although this fact somewhat alters the character of the transaction, still the Straits Settlement are a crown colony, and directly under the government of the colonial office. It could not engage in a transaction of this kind without the sanction of the imperial government, and it therefore may be presumed that the British government are parties to the scheme. The Tangong Pagar docks at Singapore have been purchased under an ordinance passed by the Straits Settlement council, and which escaped notice in the last session of the British Parliament when it was brought forward for approval. At present there would appear to be no question of the British government creating a new naval base at Singapore, although the place has been fortified for many years past. The purchase seems to have given general satisfaction to British shipping circles. The Japanese, it is believed, would in time of trouble have access to the docks, and consequently the political site of the situation would be of great advantage to both England and Japan. Shipowners hope that the docks will be further improved and made available for mercantile tonnage, which forms a great feature of British trade at Singapore.

In consequence of the Royal Mail Steam Packet Co. announcing the inauguration of a New York service from the West Indies, the Hamburg-American Line, whose service (the Atlas Line) between the same ports will be affected, have withdrawn from the West Indian conference. This may mean the breaking up of a very comprehensive freight conference, embracing several Liverpool and London lines as well as French and German companies. So far no steps have been taken by any of the lines in question, but of course under the circumstances, there is no telling where the matter may drift. Apparently the go-ahead policy of the Royal Mail Co., which has recently opened out several new services, some of which are rather in opposition to other old established lines, is causing trouble in several directions. As one example their Cuban service from Hull, Antwerp, London and Bristol Channel has caused a keen cutting of rates, more especially from Antwerp.

If the Germans have not yet been converted to the advantages which the turbine possesses over the reciprocating, at least Herr Ballin has been favorably impressed with the new mode of propulsion. The new steamer *Amerika* of the Hamburg-American Line, built at Belfast by Messrs. Harland & Wolff, has arrived at Cuxhaven with Herr Ballin on board. The new turbine steamer *Kaiser*, owned by the same company, which arrived at Hamburg on Sept. 22 from Stettin, made a successful trial trip to Heligoland, during which Herr Ballin sent a telegram to the managing director of the Universal Electricity Co., Berlin, congratulating him and the Vulcan of Stettin upon the speed of over 20 knots per hour attained by the *Kaiser*. The telegram stated that the turbines had proved a great success, and that no vibration was felt when going full speed.

On Saturday, Sept. 30, Messrs. Vickers Sons & Maxim launched at their Barrow shipyard the twin-screw armored cruiser *Natal*, of 13,500 tons displacement. This new war vessel received the name of 'Natal' by way of compliment to the colony of that name, and in recognition of the contribution made by Natal to the upkeep of the navy,

as H. M. S. *Dominion* has been named in honor of Canada. No contribution will, however, be made by Natal toward furnishing the cruiser. The vessel was christened by the Duchess of Devonshire, and many colonials witnessed the ceremony.

The British admiralty and war office, says the *London Standard*, have placed contracts in the United States for large quantities of naval and military equipment. The orders include a heating and ventilating outfit for the new admiralty buildings at Portsmouth dockyards, gas furnaces to be used for finishing projectiles and electrical equipment for Woolwich arsenal.

### TONNAGE IN BRITISH PORTS

Editor *Marine Review*: As an encouragement to the fighters for the upbuilding of Uncle Sam's ocean marine, the following figures should be noted. They represent by decennial years since 1840 the tonnage of vessels (sailing and steam) entered and cleared with cargoes and in ballast at ports in the United Kingdom from and to foreign countries and British possessions, as published in a recent issue of the *Marine Review*, of Cleveland, O., in million tons:

	British.	Foreign.	Total.
1840.....	6.49	2.94	9.43
1850.....	9.44	5.06	14.50
1860.....	13.91	10.77	24.68
1870.....	25.07	11.56	36.63
1880.....	41.34	17.38	58.73
1890.....	53.97	20.31	74.28
1900.....	62.70	35.80	98.50
1903.....	69.20	36.40	105.60

One is immediately struck with the fact that two-thirds of the ship service, to and from British ports, with foreign countries, is by British ships. Also that the growth of the British mercantile navy has been steady and persistent. Also with the immensity of the total shipping trade of British ports—105,610,000 tons in a single year, 1903, of which 69,200,000 tons was by British ships. Imagine the vast amount of the commerce paying tribute to Great Britain in connection with its own tonnage, and also in connection with the foreign tonnage; 105,610,000 tons of entering and clearing tonnage in a single year means far more business than the entire foreign commerce of the United States, large as that commerce is.

Last month, August, was a dull month, yet the total tonnage entering British ports with cargoes was 3,726,451 tons, of which 2,502,690 tons was British and 1,223,761 foreign.

Will the day ever come when American ports will be able to show ocean shipping business equal to that, or even two-thirds of the American business as being done in British bottoms?

WALTER J. BALLARD.

Schenectady.

The Board of Public Improvements of St. Louis has rejected the bids for the construction of the new harbor boat. Two bids were submitted, one was the Springfield Iron Co., for \$61,400, and the other by the Dubuque Boat Building Co. for \$64,000. Both bids exceed the appropriation, which is only \$35,000. The specifications will probably have to be changed.

An examination of the hull of the Oceanic Steamship Co.'s steamer *Alameda*, which ran on the rocks in San Francisco bay, shows that the greatest damage was on the port side directly under the fuel tank. It will be necessary to renew twenty-two plates and repair sixty-four others before the steamer will be in sea-going condition.



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OCTOBER 12, 1905.

Canada is taking steps to develop her merchant marine. The Dominion parliament has just voted a liberal allowance for the five schools of navigation at Montreal, St. John, Victoria, Halifax and Yarmouth. A general preliminary training in seamanship is given to a large number of young men, the purpose being to fit them for service on merchant vessels. All countries except the United States do something for their merchant marine.

The American government has apparently awakened to the fact that the defense of the treaty made between Canada and the United States is quite as much its business as it is that of Canada. American fishing companies have notoriously poached in Canadian waters for several years past, relying upon the speed of their tugs to escape the revenue cutters of the Dominion government. This was readily done, as several of the fishing tugs were swifter than the old revenue cutters in the service of the Dominion government. However, two years ago the Dominion government built the fisheries cruiser Vigilant for the express purpose of overtaking the fishing tugs. This cruiser has had several brushes during the present year with the fishing tugs with the net result that one tug has been sunk

and some lives lost. Other tugs have been fired upon, but not seriously injured. It was called to the attention of the federal government that it is really immoral to permit this confessed encroachment upon Canadian waters without taking any action to prohibit it. The American government has now, however, devoted the revenue cutter Morrill to the service and has apprehended a few American fishing tugs. This, if nothing more, is an evidence of good faith.

News comes from Washington that Secretary Taft of the war department has recommended a postponement of the coastal laws to Philippine commerce. Under congressional enactment the coastwise laws were to include the trade of the Philippines beginning July 1 of next year. These laws were to have gone into effect on July 1, 1904, but under representation that there was not sufficient American tonnage available, the period was extended two years. It is now apparent that Secretary Taft is reverting to his original plan of extending the time five years. When governor of the Philippines, Secretary Taft maintained that there were not sufficient ships of American register to take up the trade. It would be well to let this law go into effect and discover by actual practice whether there are any vessels available for the service. If there are not, and there is a field for them, it would seem strange indeed if they would not be built. As a matter of fact, ships of American register are now lying idle in New York harbor, which could probably be diverted profitably to this trade as soon as they are allowed a fair field.

One of the mistakes made by many of the engineers having charge of river and harbor improvements is the underestimating of the cost of the work. This is required at times by some of the members of congress who are fostering a proposed improvement. If the estimates should be large, the chances are against the work being authorized; therefore small estimates are favored. When once authorized, the cost of the work is increased from time to time. This, of course, does not enhance the standing of the officers in the estimation of members of the engineering profession.

Work which is built under water requires first-class construction, as repairs to such work are difficult and expensive. It therefore behooves the officers to submit estimates only for the best work, and this is the only class of work which should be authorized. Work done by or for the government should be beyond cavil. What is a saving of fifty thousand dollars on a million-dollar piece of work, especially if it means the risk of inferior construction.

Perhaps no government engineer was more conscientious in his estimates than the late Col. Merrill, who at one time had charge of the improvement of practically all of the rivers in the Ohio valley. In his report dated Jan. 9, 1875, on the Little Kanawha

river, he makes the following statement in regard to the cost of work for river improvements:

I am satisfied that the amount named is insufficient to secure first-class work, and none other is worth construction. Inferior work is not specially objectionable when used above water, where it is always fully under the eye of those responsible for its safety, but in sub-aqueous work it is folly to construct anything that is not strictly the best possible. The severest strains on submerged constructions come at a time when they are invisible, and when it is impossible to detect the weaknesses that might easily be strengthened if they were perceived, but which, by neglect, become entirely uncontrollable. So many cases of the destruction of river locks and dams, due to mistaken economy in first cost, have come under my notice, that I feel bound to enter my protest against such work by making my own estimates fully up to what experience shows that they should be, if the works are expected to be permanent.

This holds equally good today, and it should receive due consideration from the present Board of Engineer Officers, who have the improvement of the Ohio river under consideration. Especially is the foregoing applicable to the Ohio river, as its bed consists of sand the greater part of its length, rock often lying at a great distance below the surface. There are also numerous freshets to withstand, floods occurring almost every year, which carry large quantities of heavy drift. To this must be added ice, which has done much damage to works in the past. Poor construction is, as a rule, expensive and should not have a place in government structures.

#### FREIGHT SITUATION

The railways of the country have awakened to the fact that they lack sufficient rolling stock to care for the augmented volume of trade—this too in spite of the fact that all of the leading railways have been most liberal purchasers of cars during the past two years. Every car shop in the country is crowded with orders. In no department of industry is this shortage of cars felt more than in great lakes trade. There are not enough cars in operation to bring an adequate supply of coal to Lake Erie docks. The result is that coal shipments have seriously fallen off and some of the shipping docks have dismissed one of their shifts. The ore trade is badly crippled, Lake Erie docks being fairly piled with ore for want of cars and some of the vessels that are scheduled to load directly into cars are waiting in port a week to be unloaded. The movement of ore from now on will really be determined by the car supply. It is not expected now that the movement during October and November of this year will reach the movement of the corresponding months for last year owing to delays in port. The movement of ore, however, is very well in hand, and probably to date, 27,500,000 tons have been moved. The total movement of the year will be somewhat in excess of 32,000,000 tons. Ore shippers have covered this movement very thoroughly by contract and as they are holding contract vessels to their agreements there is slight prospect of the wild ore rate advancing, though the grain rate has been established at a somewhat attractive figure. The truth is that there are very few vessels to be had and it would not be surprising if grain shippers would have to pay still more. The rate from Chicago is two cents and from Duluth three cents. Not only is it difficult to get cars to take it from Chicago, but Buffalo railways are refusing to take grain to the seaboard and shippers are unable to get enough grain from Buffalo to fill ocean engagements. The congestion at Buffalo is daily becoming more serious and it is said exporters at New York are losing as high as three cents a bushel on account of being compelled to buy at open market. Elevators are jammed with grain and as a result of the tie-up Erie canal boatmen are getting the best rate on

grain to New York that has been paid in twenty years. Four cents is now being paid and the rate is expected to go to five and one-half cents unless conditions change.

Following is the comparative statement of ore shipments from upper lake ports for September and up to Oct. 1:

Port.	Sept. 1904.	Sept. 1905.
Escanaba .....	594,338	697,490
Gladstone .....	.....	.....
Marquette .....	360,034	377,623
Ashland .....	463,762	437,843
Superior .....	766,557	698,752
Duluth .....	892,087	1,097,887
Two Harbors .....	928,664	1,015,955
	4,006,442	4,425,550

1905 Increase ..... 419,108

Port.	To Oct. 1, 1904.	To Oct. 1, 1905.
Escanaba .....	2,292,646	3,925,355
Gladstone .....	480	.....
Marquette .....	1,178,044	2,259,834
Ashland .....	1,431,731	2,586,194
Superior .....	2,683,034	3,866,778
Duluth .....	3,041,006	6,787,378
Two Harbors .....	2,995,497	6,048,067
	13,622,438	25,473,606

1905 Increase ..... 11,851,168

#### SHORTAGE OF CARS IN NORTHWEST

Duluth, Minn., Oct. 10.—Since the very beginning of the present wheat movement there has been a serious shortage of rolling stock on the roads that do the bulk of the grain business for the northwestern state—notably the Northern Pacific, the Great Northern and the Soo line. All these roads had been busily preparing for the crop, had been passing old cars through their shops, placing repaired and re-fitted cars along the lines where they would be first needed, and all of them had bought large numbers of new cars. The Northern Pacific road alone supplied itself with 2,500 80,000-lb. cars, fresh from the shops, and the other roads bought a large number.

But so great has been the demands on rolling stock and motive power that all the roads have been completely stalled and unable to care for their business. There has been a remarkable and rather unexpected increase in general merchandise, and there have been many days recently when the merchandise demand at the port of Duluth alone on the Northern Pacific road has been 300 cars in excess of the possible supply. There has been a very large coal business and the lumber trade by rail has shown an increase that was not looked for. But the chief addition to the fall traffic has been wheat. It is coming in here at the rate of 600 cars a day, and a few mornings ago there were 1,600 cars at the three chief northwestern markets—Duluth, Minneapolis and Chicago. The interior line elevators, scattered all through the northwest, are full of grain and cannot receive what the farmers are delivering, for they have no room and cannot ship for there are not cars enough.

There is need at the present time on the leading roads traversing the grain belt of Minnesota and the Dakotas of more than 10,000 new freight cars, for wheat, merchandise and coal, and for not less than 400 road locomotives. If this is a condition common to other parts of the United States, the car and locomotive works are pretty sure of good business for a long time to come.

The new car ferry which the Great Lakes Engineering Works of Detroit will build for Lake Erie service, will be laid down at the St. Clair yard.

### NEW ORE DOCK AT MARQUETTE

With one exception, that of the Great Northern at Allouez at the head of the lakes, the new ore dock to be built at Marquette by the Duluth, South Shore & Atlantic railway will be the highest on Lake Superior. The height given in the plans, which were only recently completed, being 70 ft. 8 in. From the water's edge to the terminus of the dock, the structure will be 1,350 ft. long, and contain 200 pockets with a capacity of 250 tons of ore each, or an aggregate total storage capacity of 50,000 tons. The estimated cost of the structure is \$400,000.

The ground work approach to the dock will begin at Third street, where two retaining walls will be constructed 72 ft. apart, varying from  $2\frac{1}{2}$  to 6 ft. in thickness, and terminating at Front street, where solid concrete abutments will be built. The space between the two retaining walls will be filled in with rock and other material from the point on Third street where the approach begins, to the first abutment on the west side of Front street. The dock will be 19 ft. "in the clear" above Front street, and will rest on a steel plate girder  $72\frac{1}{2}$  ft. long. An abutment will also be built on the east side of Front street, and crossing Lake street there will be another steel girder 35 ft. above the thoroughfare, and still another girder 75 ft. long over the James Pickands company coal sheds. The girders will rest on concrete abutments, and from the point where the last girder is built over the Pickands property the dock will be built on piles. The grade for the approach to the dock is given as 2 percent.

The amount of lumber used in building the dock represents an amount almost the equivalent of the cut of a small saw mill for an entire season. The engineer estimates a total of 6,000,000 of plank and boards for cross-bracing and platforms, and to be used in the entire construction work. Owing to its great tensile strength, the specifications name Washington fir as the lumber to be used, and contracts have already been made for shipment of the required amount of lumber of this kind from the Pacific coast.

Five thousand Norway pine and tamarack piles will be used for the underpinning of the structure. These will be driven by means of pile drivers, the clay bottom in the lake precluding the possibility of driving them by water jets, as in the case where sand bottoms are encountered. Without exception, the long timbers for piling will be the Michigan product.

With the exception of furnishing the steel girders, the South Shore will have nothing to do with the building of the dock. Two contracts, covering every detail of the work, were given to Minneapolis firms. Nelson Bros. Paving & Concrete Co. has the contract for all the concrete work, and the superstructure and dock proper, including the supplying of ore pockets, and everything connected with or pertaining to the operation of the dock, was let by contract to M. J. Peppard. The structure is to be finished and ready for use at the opening of navigation in the spring of 1906.

The ore pockets will differ little from the model of the pockets in No. 4 dock. Although there has been great strides taken in the size of ore shipping piers in the past twenty years, the changes have not extended to the improvement of ore pockets, strange as it may seem, and in the most modern docks it is necessary to have a crew of men armed with long steel-shod poles to prod the ore through the car, and the same men later aid in running it through the door at the base of the dock pocket to the ship. The new dock will be 23 ft. higher than the No. 4 dock, which is the largest and most modern of the South Shore docks. Its location is on the site of what

was known as "Dock No. 3," which was one of the first docks built here, but abandoned as useless and inadequate fifteen years ago by the present company.

In the year 1872 the railway system for the Lake Superior iron trade was "completed," as was then announced by the building of the Chicago & Northwestern to Escanaba, and the consolidation of the Marquette & Ontonagon, and their extension as far as L'Anse, thus establishing railway communication from Chicago to the head of Keweenaw bay on Lake Superior. The consolidated road had an ore shipping pier at Marquette, and in that year built a second one at L'Anse. The former was the beginning of the system that has since become the terminus of the Duluth, South Shore & Atlantic railway, and the latter was long ago abandoned, and only last week leased as a merchandise shipping dock to the village of L'Anse. It was partially, but not wholly destroyed by fire many years ago. Thirty years ago the L'Anse dock was the most modern pier in existence. It was 546 ft. long, 36 ft. wide, and built on forty-three bents of piling 36 ft. high. Each pocket held about 75 tons of ore, the total capacity of the dock 6,000 tons, and the base of the pockets only 20 ft. above the water. As the ore slides by gravity from the pocket to the ship's hold, the hinge-hold, to which the chute is attached, must be so high above the vessel's side that ore will readily slide down the chute. So low were the decks of ships thirty years ago that a height of 20 ft. was ample to give sufficient incline to the chute. The new dock of the South Shore will have the hinge-hold 40 ft. above the water level.

In the older days referred to operations were at such a rate of speed that it is recorded that 6,000 tons were shipped from the L'Anse dock in a single day, and that one vessel of 476 tons, marvelous to relate, was loaded in 75 minutes. At that time the average capacity of ships was about 650 tons, ranging from 400 to 1,100.

In 1904 the ship Augustus B. Wolvin, then the largest ship on the lakes, loaded 10,245 gross tons of ore in 89 minutes at the Allouez ore docks, and was at the dock a total period of 180 minutes. Nine thousand tons of this load were put on in 34 minutes. The same year the ship J. H. Peavey loaded 6,585 gross tons in 51 minutes, and the preceding season the J. H. Hoyt loaded 5,250 tons in 30.5 minutes.

The modern ore shipping pier is not the least complex and interesting factor in the transportation situation. Its foundation is frequently 40 ft. below water level, and consists of a series of piling that cannot have much cross-bracing until the surface of the water is reached. About the water there is a height of 60 to 70 ft. more, and away on top of this is the enormous moving load of trains and locomotives, for an average of which 4,000,000 lbs. is a low estimate. Air brakes on the cars stop them in a yard or two, and there is a pressure of up to 2,500,000 foot-pounds to be taken up every time a train stops, or hundreds of times daily by the longitudinal bracing of the pier. Added to this is the fact that the center of permanent load may be 90 to 95 ft. above foundations. Docks require an enormous amount of timber, probably from 6,000,000 to 7,000,000 ft. for an average pier, nowadays, and problems met by the construction engineer are serious. The demand, is on one hand, for more bracing, and on the other for less severe switching and lighter locomotives at docks.

The building of a new dock by the South Shore will furnish employment to a large number of men during the coming winter. The cement work will have to be done before the advent of winter weather, and it is understood that a large force of men will rush this part of the work



to completion. The contractors are scouring the country for Norway and tamarack piling to be used as underpinning for the dock, and have placed orders for a part of the supply needed.

### UTILITY OF THE ERIE CANAL

Buffalo, Oct. 10.—These are the days when the transportation world longs for a more efficient waterway eastward and it appears that the period of this sort of feeling grows with each year. It came on very early this year, in fact before the fall was fairly begun, and its intensity at present is shown by the report that the poor little canal fleet, which has been doing but little during the slack grain movement through the summer, is now all taken up and it is said that ten times the capacity could be used if it were to be had. So it appears that however much we are going to need the enlarged canal it may not be such a very busy thoroughfare all through the season.

This makes it all the more necessary for canal boatmen to emphasize still further than ever before the need of boats built as cheaply as possible. The other day I asked an old canalman—there are a few of them left yet—if the new 1,000-ton barges would be built of steel, and he said they would not, for the cost would be too great. This cheapness of the boat is the great advantage enjoyed by the canal and it is to be hoped that it can be kept up when the larger size is built. As a rule the conveyance is worth much more than its load, wagon or car or steamer, but the canal is a conspicuous exception to the rule. A boat that never cost much over \$3,000 and may not be worth over half that amount will carry a cargo of wheat that has been worth more than \$10,000 this season.

It is believed that the new barge, with a capacity four times as great need not cost four times as much. Then the boatman can as now make it his home and be at small expense when it is idle. The comparisons of the competitive chances of rail and waterways do not usually take this fact into consideration. So if it happens that the enlarged Erie canal is of most, or even of sole account as a handler of the overflow in freight movements it may be able to do well, that is, earn a profit to its operators as well as relieve the congestion at such times as this. As such the railroads ought to welcome canals everywhere and they ought to own canal fleets of their own to save them from keeping a vast equipment of cars to be used three months of the year. The difficulty now is that they merely provide cars enough to do the bulk of the business promptly and let the rest of it wait. If the money lost by shippers and others concerned in the commerce of the country were laid out in appliances to obviate such loss there would be an equipment far in excess of the present.

It is just here that the canal steps in to meet the emergency. This port is just beginning to feel the car shortage in grain movements and if the amount of grain going east this fall is what is expected there will be a blockade such as has not been known here, much as we have suffered from such stoppages in the past. The canal fleet is too small to cut any figure in the case and the roads are worse overloaded than they have ever been before. The car shortage began earlier than ever before and it is expected to last till there is difficulty from snow to delay freight movement.

What a relief it will be to return to canal transportation after waiting weeks for a car and never getting half as many as are wanted. The state of things is so distressing that there is a sort of warfare going on most of the time between shippers and freight agents all along the line. Buffalo is large enough to be the receiver of a

great amount of loaded cars that can be taken at once for outgoing business, but take a way point that needs cars and there is a state of things in existence now that is close to a panic. I found such to be the case the other day at Tonawanda. The lake barges bring in a matter of 125 cars of lumber every day, of which nearly all is destined for reshipment. The canal fleet is exhausted by the sudden demand and after that there is dependence only on cars that for the most part must come in empty from some other quarter, when every shipping point is crazy for cars. The situation is terrible.

I do not believe the railroads have it in their power to stop the fast-increasing recurrence of this state of things. Certain it is that they are making no progress towards it now. At one time the increased size of cars and the corresponding increased power of the locomotives was doing something in this line, but that is at an end. It will be noted that the added facilities of this sort all came in after the railroad building stopped. What is to be done now. The roads are making money fast enough and they are not eager to do anything. Why should they?

Plainly we are back again close to the age of a return to canal building. There seems to be no other way out of the regular fall tie-up of business. It is likely that other sections will wait to see how the new Erie canal comes out, but they will be sorry if they do. By that time the country will have lost enough by delays to build a host of canals.

JOHN CHAMBERLIN.

### CANADIAN MAILS AND TURBINE DEVELOPMENT

The two splendid twin-screw steamships which the Fairfield company has now in an advanced stage of construction for the Canadian Pacific Railway Co. are expected to be in commission early next summer; they are to be named *Empress of Britain* and *Empress of Ireland*, and the first will be launched early in November. They are of 14,500 tons each, 550 ft. in length, 64 ft. beam, and their twin engines, of the "balanced" reciprocating kind, will be of such power designed to drive them 19 knots in service. The design and equipment of the vessels are such as render them equally serviceable for the passenger service on the Pacific, with the existing fleet of the company, or on the Atlantic; and, notwithstanding the success of the Allan Line Co. in again securing the contract for the carriage of the mails between this country and the Dominion, the new Canadian Pacific railway's vessels will be put on the Atlantic service between Liverpool and Montreal. The mail contract recently arranged with the Allan line is, on this occasion, only for a term of five years, in spite of the tender having been made on the basis of a ten-years' period. It is reported that Sir Richard Cartwright, the Canadian minister of trade, was favorable to the tender of the Canadian Pacific Railway Co., but the fact of the Allan line having already in service such fast up-to-date vessels as the turbine liners *Virginian* and *Victorian* was the outweighing consideration. Turbine propulsion in ocean mail steamers is not yet the thoroughly approved matter, as regards lasting efficiency, cost of upkeep, etc., which the reciprocating engine can claim to be. The projected new North German Lloyd liner, for example is to have reciprocating engines as the result of weighing all the pros and cons of the two systems. The placing on the Atlantic, therefore, of the two Canadian Pacific Railway Co.'s vessels, having reciprocating engines, promises to have an immediate interest, from an engineering standpoint, as well as that more remote interest concerned with the competition for and placing of the next Canadian mail contract.

The Maryland Steel Co., Sparrow's Point, Md., will deliver the ferryboat *Bronx* to the Department of Docks, New York, in a few days.

### LAUNCH OF THE DELAWARE

The launch of the package freighter Delaware at the Ecorse yard of the Great Lakes Engineering Works, of Detroit, on Saturday last, was an especially prompt affair. No time is usually wasted in putting lake vessels overboard, but the launch of the Delaware was especially swift. As the launching party entered the yard the workmen began tapping the blocks. The hull was fairly seen to rise in response and exactly eight minutes after the launching party entered the yard the Delaware was in the water. The hull moved so swiftly that Mrs. J. C. Evans

railway, of which the officials of the Great Lakes Engineering Works are the officers.

A rather pleasant innovation was introduced by the serving of luncheon on the special car before the party returned to Detroit. There were no speeches. President Pessano in rising to propose a toast to the sponsor of the vessel stated that the shipyard had never had a more successful launch than that of the Delaware. Everyone then drank to Mrs. J. C. Evans' health.

The Delaware is a sister ship of the Muncy, and is designed for freight purposes only. She has no passenger



Mrs. J. C. Evans and Mr. S. P. Hutchinson; Mrs. P. E. Letchworth and Mr. John R. Russel; Mrs. J. C. Evans, Sponsor; Mr. Antonio C. Pessano; Mrs. J. C. Evans and Mrs. P. E. Letchworth.  
Mrs. S. P. Hutchinson, Mrs. J. C. Evans, Mrs. P. E. Letchworth, Mrs. C. H. Hodges and Miss Elizabeth Russel; Mrs. J. C. Evans smashing the bottle; Mr. J. C. Evans, Mr. Pessano, Mr. William Livingstone, Mrs. S. P. Hutchinson and Miss Elizabeth Russel.

had barely time to crack the bottle, but she did it nevertheless, and the Delaware went into the water properly drenched with champagne. The launching party were taken from Detroit in the special car Yolande. The party consisted of Mr. and Mrs. J. C. Evans, Mr. and Mrs. P. E. Letchworth, and Mr. C. J. Fox, of Buffalo; Mr. H. W. Hoyt, of Chicago; Prof. H. C. Sadler, Ann Arbor; Mr. and Mrs. S. P. Hutchinson, Mr. Frank E. Kirby, Mr. Russel Kirby, Mr. Homer Warren, Mr. Wm. Livingstone, Mr. Marvine Gorham, Mr. P. E. Bourke, Mr. and Mrs. Charles Hodges, Miss Elizabeth Russel, Mr. and Mrs. Walter S. Russel, Mr. R. E. Plumb, Mr. Antonio C. Pessano and Mr. John R. Russel, all of Detroit. The special car was taken directly to the shipyard over the new River Rouge

accommodations. She is 370 ft. over all, 350 ft. keel, 50 ft. beam and 30 ft. deep, and is equipped with quadruple expansion engines, 19, 27, 40 and 58 in. cylinder diameters by 42 in. stroke, supplied with steam from two Scotch boilers, 13 ft. 9 in. by 11 ft. 6 in., allowed 210 lbs. pressure. She will carry 5,000 tons of freight and will probably be able to make two or three trips this fall.

Capt. C. Mathison, Brooklyn, placed in commission a week ago his new 68-ft. auxiliary scoop yacht Eliza N.

Traffic of the Suez canal, which had been suspended since the blowing up of the Chatham has now been resumed.

## CHICAGO GRAIN REPORT

Chicago, Oct. 10.—Early Lake Erie corn offerings at 13½ cents per bushel failing to attract the required responses of vessel capacity, rates were quickly advanced to 2 cents per bushel and vessels in active request. As heretofore suggested, the disposition of the market is a parity with Lake Superior, since the incentive to Lake Michigan trading is so much lessened by reason of slow coal movement. Receipts of western grain are growing rapidly, the past week noting an increase of 500,000 bu. corn over a year ago, while oats increased closely to 2,000,000 bu. The chance of congestion at Buffalo presents about the only discouraging feature, and it is to be hoped the car scarcity there will shortly be adjusted. The business of the railways during past week will note that there is no scarcity of cars at Chicago.

Following is the distribution: Via all-rail lines of flour, 90,272 bbls.; wheat, 119,629 bu.; corn, 504,908 bu., and oats, 1,597,414. Via lake to Buffalo and other American points of flour, 148,365 bbls.; corn, 856,000 bu., and oats, 249,544 bu. And via lake to Canada points of flour, 2,907 bbls.; corn, 117,500 bu., and oats, 208,000 bu.

## Lake and Rail Shipments:

	This week.	Last week.	Same week last year.
Wheat .....	119,629	290,185	312,942
Corn .....	1,478,458	2,644,778	1,719,238
Oats .....	2,054,458	1,713,980	834,085
Rye .....	107,775	13,533	29,267
Barley .....	230,405	177,210	143,680
	3,990,725	4,839,686	2,039,212
Flour .....	250,544 (bbls.)	210,018	102,178
		Since Jan. 1, 1905.	Same time last year.
Wheat .....		10,299,848	11,819,866
Corn .....		76,201,066	59,466,077
Oats .....		44,029,182	35,388,228
Rye .....		882,382	973,150
Barley .....		3,324,191	3,304,112
		134,736,669	110,951,433
Flour .....		5,040,417 (bbls.)	5,648,629

## Stocks of Grain in Elevators:

	This week.	Last week.	Same week last year.
Wheat .....	5,716,000	5,606,000	4,412,000
Corn .....	3,629,000	3,671,000	4,350,000
Oats .....	10,693,000	10,304,000	10,811,000
Rye .....	276,000	393,000	718,000
Barley .....	279,714	177,714	189,000
	20,593,714	20,151,714	20,480,000

## AT THE HEAD OF THE LAKES

Duluth, Minn., Oct. 9.—Receipts of grain at the head of the lake are growing smaller on account of the shortage of freight cars on northwestern roads. It is evident that the grain trade of the northwest is to continue all winter on a steadier plane than heretofore. Receipts for last week were 4,280,000 bu., all grains, and shipments were 4,180,000 bu.

Steel is coming to the yard of the Superior Ship Building Co. for the two new ships to be built this winter, and dredges have been put at work to lengthen the shorter of the launching slips and to add to the size of the south dry-dock.

The Hanna coal dock is to receive some coal in three weeks, as work has progressed very fast there. It will be able to stock up well this fall for the winter trade. Two dredges are filling the dock with sand from the front, and some of the flooring is down, while much of the machinery

is in place. The western half of the dock can be used this fall.

The Duluth firm of McDonald & Sullivan have the contract for all dredging for the Duluth, South Shore & Atlantic road's new ore dock at Marquette, and have begun work. There will be a continuous depth of 22 ft. at the dock side. All old piling from No. 3 dock, which has been in the water since the superstructure was destroyed, will be pulled out and replaced by heavier and more frequent piling.

According to Supt. C. W. Turner, of the A. Booth & Co. line of Lake Superior steamers, a new boat will be placed on the upper lakes next year, in the Duluth-Chicago run. This has been neglected since the retirement of the Lake Michigan and Lake Superior line.

## DEPTH OF CHANNEL VS. BEAM OF SHIP

Major Dan C. Kingman, government engineer with headquarters at Cleveland, was recently quoted in opposition in the newspapers to the deepening of the channels of the great lakes to 25 ft. Major Kingman merely doubts the advisability of such work, not the practicability of it. Writing to the *Review*, Major Kingman says:

"I have no doubt, as an engineer, of the practicability of securing a navigable channel of 25 ft. in the great lakes and their connecting waters. I have some doubt, however, as to the advisability of undertaking this work at this time. I do not know what it would cost but it would no doubt involve a great deal more work than was necessary to obtain the 20-ft. channel, because there are many places along the track of vessels where the natural depth of the water is more than 20 ft. deep but less than 25 ft. All of our important harbors are arranged with reference to a 20-ft. navigation and the deep water route would be of little value unless the harbors were changed to conform.

"Water transportation on the great lakes is carried on at present very cheaply and the possible reduction in freight rates therefore can not be very great. I am inclined to look for future economies rather in the increased carrying capacity of vessels and improved harbor facilities and dock machinery than in an increased draught. The carrying capacity of vessels hereafter to be built can be greatly increased from the present draught by giving them more beam. Indeed, they are narrow as compared with the salt water vessels. The Manchuria, 13,600 gross tons, built in 1904, is 600 ft. long and 65.3 ft. beam. The Minnesota, 20,700 gross tons, built in 1904, 622 ft. long, has 73.5 ft. beam. According to the newspaper accounts, two new vessels about to be built by the Pittsburg Steamship Co. are to be 600 ft. long and 58 ft. beam. If they were as wide as the Manchuria their carrying capacity would be increased 12½ percent, and if they were as wide as the Minnesota it would be increased more than 25 percent, or as much as it would be by a channel 25 ft. deep. If ever the United States constructs an adequate ship canal from the great lakes to the ocean, whereby our lake fleet can reach the ports of the world, it will no doubt be desirable to materially increase depths in our channels here and in our harbors.

"Very truly yours,

"DAN C. KINGMAN,

"Lieut. Col., Corps of Engineers, U. S. A."

The contract for the carrying of the mails between New York and Southampton expires on Wednesday of this week. Only one bid has been submitted for the new contract, that of the International Mercantile Marine Co.

It is announced that the Allan Line is so well pleased with the two turbine steamers, Virginia and Victorian, that it will place orders for turbine steamers of even greater tonnage.



CONSULTING BOARD OF ENGINEERS, ISTHMIAN CANAL COMMISSION.

Reading from left to right. Seated—Joseph Ripley, Henry Hunter, British representative; M. Guerard, French representative; J. W. Welker, Netherlands; Alfred Noble, Gen. George W. Davis, Chairman; William Barclay Parsons.

Reading left to right. Standing—Capt. Oakes, U. S. A., Secretary; Gen. Henry L. Abbott, Herr Engen Tincauger, German representative; M. Quellenec, French constructor of Suez canal; Isham Randolph, Chicago; Frederick B. Stearns and William H. Burr.

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### DULUTH AERIAL FERRY BRIDGE

Norton Mattocks in *The American Manufacturer*.

The Duluth ship canal, through which passes annually the same commercial tonnage that is carried through the famous Suez canal, was cut across Minnesota Point by the city of Duluth in 1871 and pile and timber cribs to hold its banks were constructed the following year. This canal was later adopted by the United States government which in 1901 widened it from 240 ft. to at least a width of 300 ft. and constructed substantial and permanent piers of crib work and concrete. The opening of the canal converted Minnesota Point into an island and the city accepted the responsibility of providing the inhabitants with adequate communication with the main land. Until 1897, a rowboat ferry was maintained, but as the population of the point steadily increased and it became popular for summer homes, a steam ferry for transportation of passengers and freight across the canal was substituted in that year for the rowboats and has been in use ever since.

The aerial bridge scheme came about through the imperative necessity of better communication with the point at a less cost than was being paid for the steam ferry service. A tunnel was proposed but was abandoned on account of its prohibitory cost. A draw bridge, a lift bridge, a roller bridge were proposed in turn but all failed to secure the necessary approval of the United States war

department, whose requirements demanded a method of transportation which in no way would impede the traffic through the canal. The suspended car transfer bridge at Rouen, France, was brought, in 1899, to the attention of the city engineer, who prepared a plan, adapting a general scheme of the conditions at the Duluth ship canal. The idea was received favorably by the United States war department and the people of Duluth. A bond issue for the amount of the estimated cost of the structure (\$100,000) was sanctioned by the state legislature and a general specification and contract were prepared and let for the erection of the structure in 1901.

The concrete piers to sustain the bridge structure were built under the original contract and the work then was abandoned by the contracting company. After various delays, a contract finally was entered into in February, 1904, with the Modern Steel Structural Co., of Waukesha, Wis., for a riveted truss on riveted steel tower; the ferry car to be supported by an inverted steel tower, in accordance with designs made by the structural company's engineer, C. A. P. Turner, and submitted to the city engineer for approval. The work was erected and completed during the winter of 1904-5.

In the foundations of the bridge, there are 730 tons of concrete. In the eight piers, which extend below the water level of the lake, there are 24 anchor bolts, two inches in diameter, fastened by means of large washers



to the bottom of the piers which hold the towers in position.

The car will carry at one time 125,000 lbs., which is equivalent to a fully loaded, double truck street car, two loaded wagons with teams and 350 passengers. The bridge has a clear height, above the normal level of Lake Superior, of 135 ft. This height was fixed by the Lake Carrier's Association and will permit passage of the highest masts. The truss at the center is 51 ft. high, making the total height of the bridge above the water 186 ft. The width, center to center, of trusses is 34 ft. and the clear span is 393.75 ft.

The car platform is 34 x 50 ft. and contains in addition to space for a street car and two loaded wagons, two enclosed and glazed cabins of pleasing interior finish, each 7 x 30 ft. The elevation of the bottom of the car above the United States government piers is six feet, and when the car is at rest its whole length is over land; hence it is not an obstruction or menace to navigation. Seven hundred tons of steel and over 100,000 rivets were used in the construction of the bridge. The motive power of the ferry car is electricity, current being supplied from two separate sources having different cable systems, and in case of the failure of one source, a switch, under the control of the motorman, enables him to turn on immediately power from the other. A further safeguard against delays is provided by an adequate hand power which can be used in the event of the failing of both sources of power.

The normal speed of the car is four miles per hour but the electrical machinery is capable of propelling the car at twice that rate. Thus the passage across the canal is made in a little over one minute.

Two 40-H. P. motors, placed under the floor of the car, actuate two drums, each 9 ft. in diameter, on which are wound 1 in. cables, extending to the truss and thence over 9-ft. idle wheels, through the inside of the lower chords to the towers, where they are fastened, producing the motion, which causes the car to run. The track to carry the car and hangers is arranged ingeniously, being enclosed on three sides within the box section of the lower chord, thus avoiding the danger of its becoming coated with snow or sleet in winter. There are four rails, within the two bottom chords, two in each and 32 wheels, arranged in pairs (eight pairs in each lower chord) roll on them, which carry the truck. As the bearings of these wheels, as well as those of the drums and idlers, have roller ball end thrust bearings, the friction of all the working machinery is reduced to a minimum. The hand power method of propulsion is applied by use of lever handles, which, by a series of gears and sprocket, communicate power to the drums on the car.

The cost of the steam ferryboat service averaged \$11,000 per annum. The cost of the ferry bridge will be \$8,000, which includes operation, maintenance and the interest on the bonds issued for the construction of the bridge. Thus a sinking fund of \$3,000 for the payment of the bond issue can be created, which in time will pay for the bridge. The especial fitness of this type of bridge to existing conditions doubtless will be appreciated more fully when it is known what enormous traffic passes under it. The following is an extract from a statement of Marine Commerce for the calendar year 1904, issued by Charles L. Potter, major, Corps of United States Engineers, in charge of the Duluth-Superior harbor improvements:—Tons passing through the Duluth ship canal, 4,037,608 entered; 7,113,297 departed; total, 11,150,905 passed through. Vessels entering, 3,246; departing, 3,147; total, 6,573. Navigation season 217 days year 1904. Con-

sidering the mean monthly freight movement during the season of navigation the Duluth-Superior harbor practically stands next to New York."

The work of erection was superintended by E. K. Coe, C. E., under the supervision of the city engineer. On April 9, 1905, there were transported 33,000 passengers, of whom 29,500 were carried between noon and 7:15 p. m., or in practically one half day—7,781 in one hour and 814 in one trip. The power necessary on the average trip is 18 H. P. The car operates as well when the wind blows 60 miles per hour as when no wind is blowing. The deflection of car is but 1 7/16 in. under a broadside wind of 60 miles per hour. The approximate cost of electric power to operate the bridge is \$800 per annum. The car makes twelve trips per hour between 5 a. m. and 12 p. m., and two trips per hour from midnight until morning. The approach to the car is by means of a paved roadway and two broad cement walks of easy grade joining on to the buffer platform. The general type shows concrete construction. The safety of passengers is insured by two sets of gates, one set on the car and the other on the approach. Both are opened and closed by the motorman.

#### ERIE'S NEW STEEL MAIL CAR

That Erie's new steel mail car appeals strikingly to postal employes is shown by a recent action of the Spokane, Wash., Branch Railway Mail Association. The association has most strongly endorsed the action of the Erie railroad in providing a car that will afford a measurable degree of safety to the mail clerks. The resolution adopted Sept. 4, 1905, follows:

"Whereas, The Erie Railroad Company has had built for use on its lines a new type of all steel mail car, and Whereas, The use of such mail car, by reason of its superior strength and non-inflammable qualities, will tend to greatly reduce the risk to life and limb of the employes of the postal service traveling in charge of the mails and minimize the danger of loss and destruction of the mails in case of accident or fire, now therefore be it

"Resolved, That our delegates from the Eighth Division Railway Mail Service to the National Convention of the Railway Mail Association to be held in Cincinnati, use their influence to secure the passage by that body of a resolution commending the action of the Erie Railroad in their construction of an all steel mail car, thereby showing their humane and progressive spirit in further safeguarding the mails of the United States and the persons in charge of same."

#### THE PORT OF MANCHESTER

The progress of Manchester as a port during the last ten years is not a little remarkable. It may be as well to observe that Manchester was constituted a customs port as from Jan. 1, 1894, Runcorn being included within its limits. The combined value of the imports and exports at the port during the decade ending with 1904, inclusive, was as follows: 1895, 13,223,726; 1896, 16,351,845; 1897, 15,987,410; 1898, 17,381,504; 1899, 19,647,952; 1900, 23,984,221; 1901, 23,161,519; 1902, 25,931,208; 1903, 29,576,320; 1904, 33,392,211. Manchester has now passed the following British ports in respect of its import and export trade: Barrow, Blyth, Boston, Bristol, Cardiff, Dover, Fleetwood, Folkestone, Gloucester, Goole, Grimsby, Hartlepool, Harwich, King's Lynn, Maryport, Middlesbrough, Newcastle-on-Tyne, Newhaven, Newport, Plymouth, Port Talbot, Southampton, Sunderland, Swansea, Weymouth, Aberdeen, Ardrossan, Dundee, Grangemouth, Granton, Greenock, Kirkcaldy, Leith, Belfast, Cork, Dublin and Limerick.



### COMMERCE OF SAULT STE. MARIE CANAL

The summary of commerce through the canals of Sault Ste. Marie shows that 5,782,944 tons of freight were moved through the canals during September. The total movement to Oct. 1 of the present year has been 31,947,743 tons, as against 20,089,632 tons in 1904, and 26,893,820 tons in 1903. The commerce through the canals this season is the heaviest ever known and will probably exceed 40,000,000 tons. Following is a summary of the various items brought up to Oct. 1, with comparative data for the two preceding years:

#### MOVEMENT OF PRINCIPAL ITEMS OF FREIGHT TO AND FROM LAKE SUPERIOR.

Items	To Oct. 1, 1905	To Oct. 1, 1904	To Oct. 1, 1903
Coal, anthracite, net tons.....	662,804	638,459	893,153
Coal, bituminous, net tons.....	4,196,459	3,208,389	4,642,588
Iron ore, net tons.....	23,788,994	12,394,797	17,745,150
Wheat, bushels.....	21,407,022	20,364,837	30,421,255
Flour, barrels.....	2,831,279	2,189,546	4,507,456

#### REPORT OF FREIGHT AND PASSENGER TRAFFIC TO AND FROM LAKE SUPERIOR, FROM OPENING OF NAVIGATION TO OCT. 1 OF EACH YEAR FOR THREE YEARS PAST.

##### EAST BOUND.

Items.	To Oct. 1, 1905.	To Oct. 1, 1904.	To Oct. 1, 1903.
Copper, net tons.....	75,378	65,533	76,359
Grain, other than wheat, bushels.....	17,320,233	12,094,233	13,790,255
Building stone, net tons.....	7,963	19,116	9,640
Flour, barrels.....	2,831,279	2,189,259	4,507,456
Iron ore, net tons.....	23,788,994	12,394,797	17,745,150
Iron, pig, net tons.....	45,346	28,282	13,093
Lumber, M. ft. B. M.....	687,044	624,014	713,017
Silver ore, net tons.....	1,313	1,313	
Wheat, bushels.....	21,407,022	20,364,837	30,421,255
Unclassified freight, net tons.....	70,333	63,784	69,863
Passengers, number.....	23,915	17,091	26,437

##### WEST BOUND

Coal, anthracite, net tons.....	662,804	638,459	893,153
Coal, bituminous, net tons.....	4,196,459	3,208,389	4,642,588
Flour, barrels.....	7,175	287	50
Grain, bushels.....	1,533	1,625	1,290
Manufactured iron, net tons.....	96,856	111,574	111,876
Salt, barrels.....	317,780	2,1959	300,668
Unclassified freight, net tons.....	498,121	372,828	377,753
Passengers, number.....	26,656	16,871	25,869

#### SUMMARY OF TOTAL FREIGHT MOVEMENT IN TONS.

	To Oct. 1, 1905.	To Oct. 1, 1904.	To Oct. 1, 1903.
East bound freight, all kinds, net tons	26,445,515	14,716,540	20,818,355
West bound freight, all kinds, net tons	5,502,228	5,373,092	6,075,465
Total freight, net tons.....	31,947,743	20,089,632	26,893,820

Total number of vessel passages to Oct. 1, 1905, was 15,844, and the registered tonnage, 26,410,831.

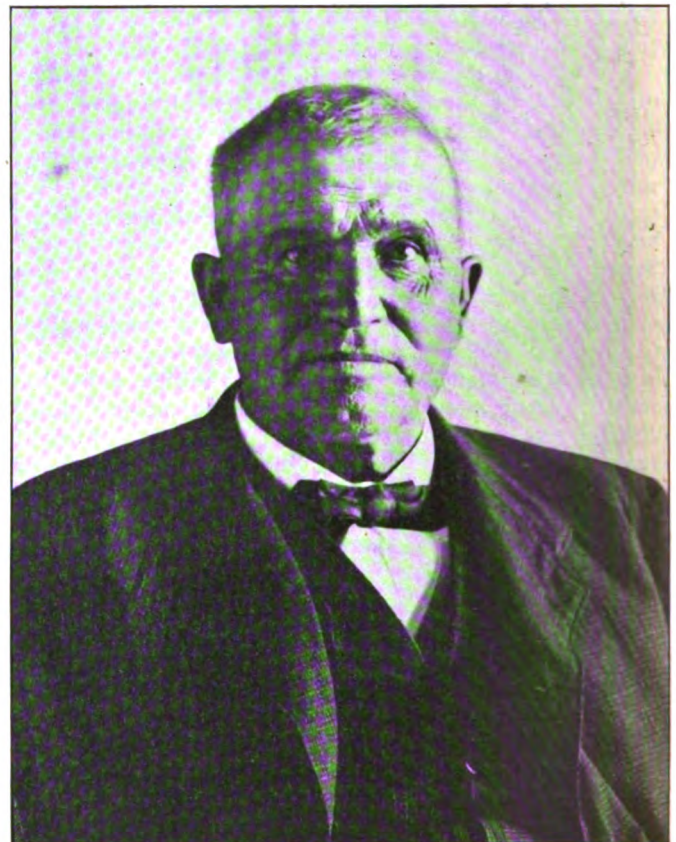
### INSPECTING CLEVELAND HARBOR

The members of the Cleveland Chamber of Commerce, under the direction of a special committee consisting of Arthur D. Baldwin, E. C. Collins, A. Ward Fenton and Chauncey O. Ransom, made a tour of the inner and outer harbor of Cleveland on Tuesday of this week on the steamer City of Grand Rapids. Major Dan C. Kingman, government engineer, accompanied the members and explained the improvements under way in the outer harbor. The government is now constructing a new entrance to the harbor. Two piers, 700 ft. apart and 1,250 ft. from the present breakwater, are now in process of construction. They will be extended to connect with the breakwater in the shape of a funnel, the small end of the funnel being at the outer end. The piers will have lighthouses among them. The eastern breakwater will eventually be extended as far east as Gordon park. Major Kingman also explained a plan for the improvement of the marine hospital ground just east of Erie street. He recommends the building of piers somewhat similar to those at the end of Erie street, and the making of about eighteen acres of new ground, beyond the Lake Shore tracks. He thinks that this new ground could be advantageously used for the construction of the new Union station, as well as

afford new anchorage for the engineers' boat, government cruisers and naval reserve boats.

### RETIREMENT OF HENRY HESS

Mr. Henry Hess, who resigned as chief engineer of the Western Transit Co.'s fleet, holds the lake record for continuous service in one company. Mr. Hess began his career as a sailor in 1855 and a year later secured a position as



HENRY HESS.

fireman with the Western Transit Co. on one of its first steamers, the Dunkirk. In 1859 he was given second engineer's papers and was transferred to the steamer Free State. In 1865 he was made first engineer of the steamer Mohawk and was during that year made chief engineer of the fleet. He supervised the machinery of nearly every vessel in the company's fleet, including the Commodore, Fountain City, Albany, Hudson, Mohawk, Troy, Buffalo, Chicago and Utica. At the time of his retirement he was in the new steamer Superior, which was built at the yard of the Great Lakes Engineering Works, during the present season. In all his career as a sailor Mr. Hess has never had an accident.

The car ferry Grand Haven, owned by the Grand Trunk car ferry line, which has been operating the boat between Milwaukee and Grand Haven, will be sold to the highest bidder on Nov. 7. It appears that the line is in default of interest on bonds held by the Fidelity Trust Co., of Milwaukee.

The Craig Ship Building Co. have orders for two passenger steamers to be 275 ft. long, 40 ft. beam and to have a speed of 17 knots. One of them is for the Indiana Transportation Co., Michigan City, Ind.



## AROUND THE GREAT LAKES

It is quite likely that the Anchor line will remodel the Tionesta this winter to correspond with the Juniata.

The Chicago River Improvement Association made a trip of inspection of the Chicago harbor and river on Thursday of this week.

The steamer Puritan, of the Graham & Morton line, is to receive four new Scotch boilers at the shipyard of Johnston Bros., Ferrysburg, Mich.

The Canadian cruiser Vigilant was at the shear dock of the Detroit Ship Building Co. last week receiving repairs to her machinery.

A new chart in colors of Manitowoc harbor has been issued by the United States Lake Survey Office and is now for sale by the *Marine Review*.

The tug Tuthill which was sunk in St. Clair flats by the steamer D. C. Whitney has been abandoned by the owner, John B. Nagle, of Toledo.

Handy Bros., Bay City, Mich., have purchased the steamer J. Gould, formerly on the Lake Superior line, and will convert her into a lumber barge.

The lumber schooner King Fisher, which was lying at the foot of Wason street, Cleveland, broke away this week in the heavy sea and was pounded to pieces on the beach.

The Monongahela River Consolidated Coal & Coke Co. is making repairs to the steamers Samuel Clark, Jim Wood, Resolute, Ironsides, Robert Jenkins and others.

The customs measurement of the new steamer Wm. G. Mather shows that her gross tonnage is 6,838, which is greater than that of any other vessel on the great lakes.

The new steamer John Stanton, built at the Lorain yard of the American Ship Building Co. and launched on Sept. 16, left Lorain on her maiden trip on Tuesday of this week.

M. A. Hanna & Co., of Cleveland, will assume control of the Pennsylvania railway docks in Sandusky, after Jan. 1. Minor improvements in dock equipment are contemplated.

The barge Sophia Minch, lumber laden in tow of the steamer Badger State, was nearly cut in two last week by the steamer Saxona in collision near Hurley's coal dock in the Detroit river.

The new steel Canadian lake freight steamer Glenallah has reached the great lakes from Scotland. She is of Canadian canal size and belongs to the fleet of the Union Steamship Co., Hamilton, Ont.

It was necessary to lighten over 1,000 tons of hard coal from the steamer Brazil before she could be released from the rocks off Stoney island reef near the Lime Kiln Crossing. It took three tugs to pull her off.

Capt. Claud M. Ennes will bring out one of the Jones & Laughlin steamers, now building at the yard of the Great Lakes Engineering Works. Capt. Ennes is at present sailing the steamer Perry G. Walker for the Gilchrist fleet.

The steamer D. M. Whitney this week took out the largest cargo of wheat ever shipped from Fort William. It consisted of 245,000 bushels. The largest previous cargo was that of the Oliver, which carried 236,000 bushels in 1899.

The barge Edward Kelly has been sold by C. W. Kotcher, of Detroit, to Henry M. Loud, of Oscoda, who recently purchased the steamer Badger State from Hugh Haver. The Kelly is 187 ft. long, 36 ft. beam and was built in Port Huron in 1874.

A six-year contract for the enlargement of the Toledo Strait channel has just been completed by the Great Lakes Dredge & Dock Co. The contractors ran but five days over the time specified. The channel is now 400 ft. wide and 22 ft. deep for its entire length of ten miles.

The annual report of the Lake Superior Corporation for the year ended June 30 last shows a surplus of \$578,248, which is equal to 1.44 percent of outstanding capital

of \$40,000,000. Alfred P. Roller was chosen to succeed George B. Turrell, deceased, on the board of directors.

The Baltimore & Ohio Railroad Co. is making good use of the excellent harbor at Fairport, O., and, as a result of the careful attention given dredging, a very satisfactory depth of water is maintained. The steamer J. C. Wallace with 10,310 gross tons of ore recently came into the harbor, winded and went out without the use of a tug.

The barge Noquebay, in tow of the steamer Lizzie Madden, caught fire this week when twenty miles east of Bayfield and was burned to the water's edge. The Madden started at once for shore at Stockton and succeeded in beaching the boat at Presque Isle Point, where the crew was saved. The Noquebay was owned by the estate of T. F. Madden, of Bay City.

The managers of the Lumber Carriers' Association have appointed a committee consisting of J. A. Calbick and W. D. Hamilton, of Chicago, and C. T. Williams, of Cleveland, to prepare a plan for handling freight for the lumber boats next year. It will be submitted at the annual convention of the Lumber Carriers' Association at Detroit next January.

The Indiana Transportation Co., Michigan City, Ind., at its last meeting voted to increase the capital stock of the company from \$133,000 to \$300,000. The company proposes to add a new passenger steamer to its fleet. The plans so far developed call for a steamer 285 ft. long and 40 ft. beam, with main, cabin, promenade and hurricane decks capable of accommodating from 3,000 to 3,500 passengers. With the exception of the whaleback steamer Christopher Columbus, there is no passenger steamer devoted exclusively to Lake Michigan service, that is as large as this.

The Canadian steamer Fairmount is now taking 2,000 tons of iron ore from Pilley's island, near the coast of Newfoundland, to Washburn, Mich., on the south shore of Lake Superior. There are two unusual features in connection with the movement, one is that she carries a cargo of iron ore to one of the greatest iron ore producing centers in the world, the other that the cargo is carried the full distance without transshipment which is very unusual with cargoes from that section. The ore is a peculiar grade different from that found in Michigan and is wanted for a special purpose.

It is announced that the Hon. Raymond Prefontaine, minister of marine for the Dominion government, has decided to call in the services of a London expert in connection with designing a new ice breaker to be put on the winter route between Pictou, N. S., and Georgetown, P. E. I. After the experience of the Dominion government with the ice crusher Montcalm in the St. Lawrence river, it would appear as though they might come to the great lakes for expert advice. Ice crushers have been successfully operated on the great lakes for many years and have kept channels open during the severest winters.

The deeds of heroism in saving life on the great lakes are quite as fine as those on the ocean. The action of Capt. W. B. Van Sickle and crew of the tug Andrew J. Smith in rescuing the crew of the schooner Senator in Lake Michigan was most commendable. The hulk of the schooner was sighted by the tug lying in the trough of the sea with all her rigging gone. The sea was running so high that it was impossible to launch a small boat. After much difficulty a line was thrown from the tug to the schooner. It took two hours' continuous labor to haul the crew of the schooner through the sea to the tug. By that time it was blowing a gale and it required great courage and seamanship for the tug to land her passengers at Mackinac island. The hull of the Senator was towed the next morning into Frankfort by the car ferry Ann Arbor.

## OUR FOREIGN COMMERCE

At the recent meeting of the Ohio Bankers' Association in Cleveland Mr. Harvey D. Goulder, president of the Merchant Marine League of the United States delivered an address upon the subject "Our Foreign Commerce." Mr. Goulder spoke as follows:

"Circumstances give me the privilege, and with it the responsibility, of presenting the views of the Merchant Marine League of the United States on the subject of our foreign marine. I cannot hope to express, nor will it be permissible to detain you with, the individual views of members of this national organization. Regardful that any expression must be conservative, mindful also that while we are glad to discuss details the occasion does not invite this or furnish needed time, there is no hesitation in making public expression of what may properly be taken as the consensus of opinion of a large number of men, for the most part free from any selfish interest upon what many regard the most important economic and political question now before the people,—the question of transportation, internal and external. The immediate purpose of our organization is to point out our need and dependence upon a foreign merchant marine, and invite and incite the best thought upon the subject of how this may be accomplished, urging a crystallization of public sentiment that we need and can afford a foreign merchant marine; or, more properly stated, that we cannot afford to be without a foreign merchant marine under our own flag.

"So much by way of introduction of the Merchant Marine League, which I have the distinction to represent before your convention.

"Superficial consideration would submerge this in the economic question of tariff, which furnished fecund opportunity for earnest and conscientious debate. It is because the subject is superior to such treatment that our League exists.

"At the hearing in Cleveland before the Congressional Commission, there appeared a man known to be earnest, thoughtful and consistent, who argued that the United States should consume its own productions and therefore, should not be concerned either with foreign commerce or with world politics. What he said was impressive from that point of view. Another came with the statement of the selling of steel plates delivered at Belfast, Ireland, something like \$8 a ton less than at Pittsburgh for the use of our home shipbuilders.

"Careful thought on both of these propositions would seem to indicate that neither can furnish aid in the solution of the question, which, in its purely commercial and least important sense, is this: Our nation has a larger navigable seacoast than any other nation in the world, and now leads the other nations in manufactures, and has more than one-third of its entire population in cities and towns. We were once an agricultural country, sending out the products of the soil. When this nation began, we had something like six, possibly seven percent, of the then meagre population in cities and towns. Other countries, needing food stuffs or raw materials for their manufactures, may be depended upon to come according to their convenience for such material as they choose to buy here. But we have gone forward in manufacturing to such an extent that, as stated more than one-third, to be exact, quite thirty-five percent, of the population of the United States is in industrial centers. The real strength of our country still may be in the agricultural districts, and should better remain there; nevertheless we have come to be and, if prosperity is to remain with us, must increasingly continue to be a nation exporting not only rudimentary products, but the accomplished products of labor, in which the cost of labor so predominates that it may be roughly estimated at 80 to 90 percent. Everything of this character that we send out is world competitive. With railroad

and other building in this country we have our enormous home market, but it is essential that we make our market as broad as we can.

"History shows the success of those nations which have sent out their own goods under their own flag. Not alone the consideration of time, but the intelligence of this audience forbids illustration of this truth.

"Keeping for the moment to the purely commercial and economic side of the question, we have shown on the great lakes a progress to which the country is indebted for its supremacy in the steel industry. It may interest you to give some figures which were recently worked out. In 1871, the prototype of the present lake freighter was built. She carried 900 tons on a trip; freight then averaged about \$3 a ton for a haul from Marquette to Cleveland, something over 600 miles. It was regarded fair dispatch for her to load in two days and unload in four. In the lake navigation season of eight months, she could haul 10,000 to 12,000 tons. The Government furnished to shipowners the exclusive right of coast-wise navigation and has spent about \$40,000,000 in improving the channels, with the result that the lake freighter of today carries as much in a single trip as her prototype carried in an entire season, and for a freight of seventy cents from Marquette and seventy-five cents for the three hundred miles longer haul from the head of the lake. The freight includes all handling charges; she has been loaded in an hour and a half and discharged into cars in a little over four hours, and we have developed the finest working fleet in the world, just now having arranged for the building of two ships of 600 ft. length and 12,500 tons' carrying capacity. Not more than twenty ships in the world are longer than these, and, but for our restricted draught of some 20 ft. on the lakes, not more than twenty would have greater carrying capacity.

"The point I desire to make is that with the Government aid of the coasting laws and with the \$40,000,000 expended by the Government on channels and harbors, we have been enabled on the lakes to give the cheapest transportation known in the world. Upon this is founded the supremacy of this country in the steel industry, because down these lakes there is coming this year more than 30,000,000 tons of ore, which will represent more than 80 percent of the iron in a production of 22,000,000 tons or upwards of pig iron in this country this year. Every preparation is being made to increase even this in another year, some twenty-five percent based on conservative estimate.

"Still holding to the purely economic side, the excuse for our common experience of passenger trains being late on large lines, as well as for delays in freight deliveries, is the great bulk of freight business which the railroads are doing. We are asking on the lakes for additional locks at the Sault and for additional channels at the expense of some millions, and the expenditure should be authorized. People of the Ohio valley are asking for improvements in the Ohio river, and so on down the Mississippi at the expense of millions, and the simple fact is that the United States cannot afford to deny this request. No investment of Government funds will ever equal in broad national advantage the contributions to transcontinental railroads and the investments in improving internal waterways already made, or which shall with an awakened spirit in this country, be granted by congress. Canada has taken this lesson wisely because broadly. We are now spending about \$20,000,000 a year for these vital improvements. It will be a short time only when the enlightened mind and quickened business conscience of this country will double this expenditure or multiply it by three. Transportation through the great lakes down the Ohio and Mississippi rivers, and by the railroads which parallel these routes or give independent transportation to tide water on the Atlantic and Pacific and the Gulf coasts, is going forward, and no thoughtful man would think of delaying the progress. But



when you get to tide water by any route, 90 percent of the things you have to send abroad and which you get back in traffic, is turned over to foreign ships. This the American people will not long endure. We cannot expect or hope that our world competitive products of the soil or the factory can go abroad in fair competition and with proper results if we are to depend upon our rival in trade for their introduction and delivery abroad. It is a proposition self-evident, requiring no argument. It has never been seriously disputed.

"If it be argued that free and unrestricted trade suggests that we leave this without government support, answers spring up which would exhaust your patience in their mere enumeration. Some or most of them will suggest themselves.

"But what has been said argues only the weakest point of the question. We need a merchant marine because in case of war among the nations upon whom we now depend our foreign commerce itself will be stifled. We need the merchant marine because just as surely as war shall come to us with any maritime nation, our great and increasing navy will be of minimum efficacy, lacking a naval reserve upon which to draw for recruits and ships for auxiliaries. However satisfying this reason may be in patriotic view, a normal condition would strengthen it; a foreign marine, in keeping with our standing as a commercial nation, accompanied by an efficient navy, each supporting the other as occasion may require.

"The question of expense is raised. We are going forward with the Panama canal, yet it is predicted that if we build a sea level canal, the expense will not fall much, if any, short of \$500,000,000. Our naval establishment will soon cost \$150,000,000 a year. The pension cost is nearly the same. For city free delivery, the nation paid in 1904 nearly \$21,000,000. For rural free delivery, to meet the convenience of our population outside of cities, the annual expense already reaches nearly \$13,000,000. For so expediting the mail as to anticipate one delivery, the government spends more each year than would be the expense of establishing the foreign marine.

"Time forbids extended argument of details. Suffice here that one of the strongest commissions to which was ever submitted a similar subject—five senators and five members of the house of representatives—spent months in gathering testimony and data from every source. Their hearings developed a general belief that the necessities of this country require a foreign marine under our flag. Now we have the spectacle of the great American nation, the greatest on earth, hesitating, fumbling and stumbling over the word "subsidy" and missing the substance, and not one who hesitates gives an adequate reason.

"To be plain about it, there is no question of subsidy; it is a question of self-defense. It is not the benefit to the individual shipbuilder, shipowner, master, mate or seaman. The question does not turn on the percentage of American sailors employed. All these are incidental details. It sums up in this: Do we need a merchant marine in the foreign trade under our own flag? And the answer, without serious dissent is, Yes, for the sake of the nation as a whole. Then, how to get it? Those who say it will come in time without government support, are hoist with the petard, that for fifty years the industry has declined and with all our prosperity and abundance of money and cheap money, not a single ship is building for the trade, thoroughly as urgent need is conceded. Answering all suggestion of selling materials more cheaply abroad, for some fifteen years all material to build or repair ships for foreign trade have been quite free of duty. Free ships would not overcome the greater cost of operation under American conditions. Discriminating duties, besides involving treaty complications, would require the re-imposing of abandoned duties in order that there should be something upon which to discriminate, but also unless a mile schedule were made, the ship carrying a cargo of sugar 15,000 miles could receive no greater benefit than that which carried 1,500 miles.

"What our league stands for, what we believe this country

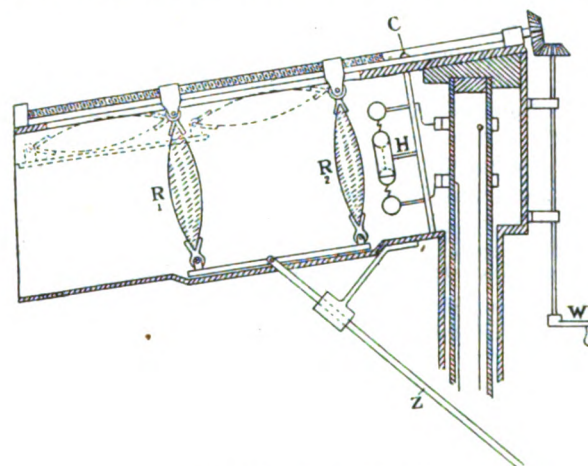
wants and needs and will have, is honest goods sent abroad in American ships, introducing where we are now not known in trade the American flag as the trade mark and assurance of fair dealing. Then our foreign trade will grow as has our internal trade, and the prosperity of the United States will be doubly assured."

### THE TELEMobiloskop

Consul Bardel of Bamberg, Germany, reports the invention of the telemobiloskop by a resident of Dusseldorf, an apparatus which merits the attention of all seafarers, and which is said to have gained the special attention of German maritime circles. Describing the telemobiloskop, Consul Bardel writes:

The telemobiloskop is to enable the pilot of a ship, in foggy weather, to discover the nearness of another vessel, even if the pilot of the other vessel neglects to give signals by which he could make himself heard. The apparatus works automatically, so that after it is once adjusted nothing whatever has to be done until a ship is discovered by it, when, by an unimportant manual action, the nearness of the other ship can be disclosed. The invention is based on the principle that electric waves, such as are used by wireless telegraphy, are reflected the moment they strike metallic objects in their course, while otherwise they continue on their journey.

The accompanying sketch shows a part of the apparatus. The carrier of the same is the axle C, which has to be hung



THE TELEMobiloskop.

so that with all the motions of the ship it has to remain in the same vertical position. Around this axle, moved by a machine, turns the large projecting box, which slants off somewhat toward the water, and, standing on some high elevation, perhaps the mast, continually searches the ocean for another vessel. H represents the inductorium of the sparks. Here, as the little darts, indicate on the sketch, sparks generate continuously, which sparks form the electric waves which are sent out of the projecting box to the surface of the ocean. The inventor claims that every large ship can produce electricity, and with the modern steamers and men-of-war it is only a question of tapping a small quantity of it from existing plants to properly feed H.

In order to make the electric waves travel compactly in a body, two lenses, R, are adjusted inside the box; they are to shape the electrical waves into a cylindrical bundle. This mass of waves, now in constant rotation, with a slanting tendency toward the horizon, searches the surroundings. If the waves strike a ship (all ships have metal parts of some kind) a reflex will bring them back to where they started. To catch this a receiver, similar to those used for wireless telegraphy, is adjusted over the projecting box. A metal plate between the receiver and the box so separates the electrical waves that only those returning can strike the receiver.



The receiver at once indicates to the captain that a ship is near, and locates her. To discover the exact distance to the other vessel, the lenses R, are so turned by means of the handles W or Z, as to get the strongest reflection from its metal parts, which the loudness of the indicator will mark out.

### BIDS FOR NAVY YARD SUPPLIES

Washington, Oct. 10.—Bids were opened this afternoon at the bureau of supplies and accounts of the navy department for a considerable quantity of equipment and supplies for various navy yards. Among the bidders and the items upon which they submitted proposals are the following:

Austin Manufacturing Co., Chicago, Ill., one rock crushing plant, \$1,962.50.

Alliance Machine Co., Alliance, O., one single frame steam hammer, 800 lbs., \$1,085.

Algiers Iron Works, New Orleans, La., for repairing all damage to 10-ton locomotive crane caused by overturning, \$1,450.

The Allis-Chalmers Co., Milwaukee, Wis., one rock crushing plant, \$2,175.

Brown & Sharpe Manufacturing Co., Providence, R. I., one No. 2 A universal milling machine, \$1,789.70.

Bethlehem Steel Co., South Bethlehem, Pa., 2,000 lbs. of soft steel, \$68.

Becker-Brainard Milling Machine Co., Hyde Park, Mass., one No. 2 A universal milling machine, \$1,685.

Baird Machinery Co., Pittsburg, Pa., one engine lathe, screw cutting, 18 in., \$579; one emery wheel grinding lathe, \$89; one engine lathe, screw cutting, 24 in., \$940; one No. 2 A universal milling machine, \$1,571; one vertical drill press, \$185; one single spindle sensitive drill press, \$65.50; one magnetic metal separator, \$105; one hydraulic shaft-straightening machine, \$3,395; one hydraulic shaft-straightening machine, \$210; one single frame steam hammer, 800 lbs., \$833; one hydraulic pipe-bending machine, \$320; one pipe-bending machine, \$139; one belt-driven universal radial drill, \$1,175; one 6-ft. universal radial drill, \$1,565.

J. B. Connell Iron Works, New Orleans, for repairing 10-ton locomotive crane, \$887.

Camden Iron Works, Camden, N. J., one hydraulic shaft-straightening machine, capacity up to 10 in., \$990; one hydraulic shaft-straightening machine, capacity up to 3 in., \$520; one hydraulic pipe-bending machine, \$530.

Carnegie Steel Co., Pittsburg, Pa., 42,900 lbs. medium steel angles, \$1,033.89; 71,240 lbs. medium steel plate, \$1,581.53; 8,000 lbs. rivet steel, \$177.60; 18,000 lbs. flat bar iron or steel, \$378; 5,100 lbs. angle steel in bars of 20 in. length, \$118.83.

Crucible Steel Co. of America, Pittsburg, Pa., 8,000 lbs. cold rolled copper sheathing, \$1,672; 2,000 lbs. steel, 6 in. square, \$78; 2,400 lbs. sheet copper, \$561.84; 8,085 lbs., 50-carbon open-hearth alloy, \$646.80.

Carpenter Steel Co., Reading, Pa., 8,085 lbs. 50-carbon open-hearth alloy, two bids, \$505.31 and \$1,455.30; 3,195 lbs. mild steel, \$95.85.

Chicago Pneumatic Tool Co., New York city, one pipe-bending machine, \$135.

Deitrick & Harvey Machine Co., Baltimore, Md., one belt-driven horizontal drilling and boring machine, \$2,109.

Drew Machinery Agency, Manchester, N. H., one rock-crushing plant, two bids, \$2,592 and \$2,934; one magnetic metal separator, two bids, \$115 and \$183; one hydraulic pipe-bending machine, \$332; one single frame steam hammer, 800 lbs., \$834.50; 25,000 button head cap screws, \$325.30; 168 dozen machine bits, \$358.80.

Erie Foundry Co., Erie, Pa., one single frame steam hammer, 800 lbs., \$748.

Mr. Edward J. Etting, Philadelphia, Pa., one magnetic metal separator, four bids, \$250, \$360, \$200 and \$300.

Fox Machine Co., Grand Rapids, Mich., one emery wheel grinding lathe, \$75; one belt-driven wood lathe, \$340; one single spindle sensitive drill press, \$55; one belt-driven band saw, \$182; and one hand planer and joiner, \$185.

The Fairbanks Co., one 30-in. engine lathe, two bids, \$1,630 and \$1,740; one engine lathe, screw cutting, 18 in., two bids, \$575 and \$617; one engine lathe, screw cutting, 24 in., four bids, \$880, \$945, \$975 and \$1,060; one No. 2 A universal milling machine, \$1,768; one vertical drill press, \$210; one belt-driven universal radial drill, two bids, \$1,340 and \$1,410; and one 70-ton railroad track scale, \$1,324.

R. W. Geldart, New York city, one hydraulic shaft-straightening machine for shafts up to 10 in., \$3,289; one ditto for shafts up to 3 in. diameter, \$198, and one hydraulic pipe-bending machine, \$299.

George Gorton Machine Co., Racine, Wis., one engraving machine, \$944.50.

Hendy Machine Co., Torrington, Conn., one engine lathe screw cutting, 18 in., \$675; one engine lathe, screw cutting, 24 in., \$1,077; and one No. 2 A universal milling machine, \$1,510.

Hill, Clarke & Co., Boston, Mass., one 6-ft. universal radial drill, \$1,750.

Handlan Buck Manufacturing Co., St. Louis, Mo., one horizontal boring and drilling machine, \$1,850; one vertical drill press, \$195; one steam hammer, 800 lbs., \$834; one 37-in. vertical boring and turning mill, \$1,750.

Lucas Machine Tool Co., Cleveland, O., one No. 1 horizontal boring and drilling machine, \$1,640.

Motley, Green & Co., New York city, one rock-crushing plant, \$2,023.68.

Manhattan Supply Co., New York city one emery wheel grinding lathe, \$147.50; one single spindle sensitive drill press, \$42.85; one hydraulic shaft straightening machine for shafts up to 10 in., \$3,674; ditto for shafts up to 3 in., \$240; one hydraulic pipe bending machine, \$374.

Manning, Maxwell & Moore, New York city, horizontal boring and drilling machine, \$1,650; 30-in. engine lathe, \$2,358; engine lathe, screw cutting, 18 in., two bids, \$587 and \$670; emery wheel grinding lathe, \$69; engine lathe, screw cutting, 24 in., two bids, \$1,056 and \$935; No. 2 A universal milling machine, \$1,584; vertical drill press, \$174; sensitive drill press, \$50; magnetic metal separator, two bids, \$125 and \$300; hydraulic shaft straightening machine, shafts up to 10 in., \$3,350; ditto, shafts up to 3 in., \$200; 800-lb. steam hammer, two bids, \$935 and \$960; hydraulic pipe bending machine, \$310; one pipe bending machine, \$126; belt-driven horizontal drilling and boring machine, four bids, \$1,400, \$1,960, \$1,510 and \$2,070; one 37-in. vertical boring and turning mill, \$1,450; belt-driven universal radial drill, three bids, \$995, \$1,030 and \$1,140; one 6-ft. universal radial drill, \$1,525.

Niles-Bement-Pond Co., New York city, horizontal boring and drilling machine, two bids, \$1,700 and \$1,910; 30-in., engine lathe, \$1,800; engine lathe, screw cutting, 18 in., \$508; engine lathe, screw cutting, 24 in., two bids, \$1,033 and \$973; No. 2 Universal milling machine, \$1,385; vertical drill press, \$171; 800-lb. steam hammer, \$870; horizontal drilling and boring machine, \$3,250; 37-in. vertical boring and turning mill, two bids, \$1,600 and \$1,390; universal radial drill, \$1,025; 6-ft. universal radial drill, \$1,550.

Oliver Machinery Co., Grand Rapids, Mich., wood lathe, \$595; belt-driven band saw, \$351; hand planer and joiner, \$423.

Pratt & Whitney Co., Hartford, Conn., sensitive drill press, \$85.50; one belt-driven semi-automatic machine for making screw glands for surface condensers, \$682.50.

Prentiss Tool & Supply Co., New York city, horizontal boring and drilling machine, \$1,720; vertical drill press, \$159; 800-lb. steam hammer, \$835; 37-in. vertical boring and turning mill, \$1,475; universal radial drill, \$1,355; and 6-ft. universal radial drill, \$1,849.

### SUMMARY OF NAVAL CONSTRUCTION

The monthly summary of construction prepared by the Bureau of Construction and Repair, navy department, shows fair progress upon all naval vessels. The summary would indicate that the New York navy yard is forging ahead of the Newport News Co. in the construction of the sister battleships Connecticut and Louisiana. Following is the summary:

Name of Vessel.	Building at	Percent of Completion,	
		Sept. 1.	Oct. 1.
BATTLESHIPS.			
Virginia	Newport News S. B. & D. D. Co.	92.89	94.24
Nebraska	Moran Bros. Co.	70.58	81.
Georgia	Bath Iron Works	86.44	87.44
New Jersey	Fore River Shipbuilding Co.	89.3	90.1
Rhode Island	Fore River Shipbuilding Co.	93.0	93.7
Connecticut	Navy Yard, New York	86.15	89.39
Louisiana	Newport News S. B. & D. D. Co.	85.40	87.73
Vermont	Fore River Shipbuilding Co.	61.4	63.8
Kansas	New York Shipbuilding Co.	60.1	62.7
Minnesota	Newport News S. B. & D. D. Co.	71.16	73.86
Mississippi	Wm. Cramp & Sons	38.71	40.87
Idaho	Wm. Cramp & Sons	33.66	36.22
New Hampshire	New York Shipbuilding Co.	18.2	20.4
ARMORED CRUISERS.			
California	Union Iron Works	81.8	82.9
South Dakota	Union Iron Works	80.6	81.9
Tennessee	Wm. Cramp & Sons	84.32	86.08
Washington	New York Shipbuilding Co.	83.9	85.8
North Carolina	Newport News S. B. & D. D. Co.	14.96	19.20
Montana	Newport News S. B. & D. D. Co.	13.04	16.81
PROTECTED CRUISERS.			
St. Louis	Neafie & Levy S. & E. B. Co.	75.7	79.60
Milwaukee	Union Iron Works	80.6	82.
Charleston	Newport News S. B. & D. D. Co.	99.7	99.8
TRAINING SHIPS.			
Cumberland	Navy Yard, Boston	95.	95.
Intrepid	Navy Yard, Mare Island	97.5	97.5
SCOUT CRUISERS.			
Chester	Bath Iron Works	0.	6.11
Birmingham	Fore River Shipbuilding Co.	4.7	9.3
Salem	Fore River Shipbuilding Co.	4.3	8.2
TORPEDO BOATS.			
Goldsborough	Wolff & Zwicker	99.	99.
O'Brien	Lewis Nixon	99.	99.
SUBMARINE TORPEDO BOATS.			
Submarine T. B. No. 9	Fore River Shipbuilding Co.	17.06	25.4
Submarine T. B. No. 10	Fore River Shipbuilding Co.	16.5	21.1
Submarine T. B. No. 11	Fore River Shipbuilding Co.	16.5	23.6
Submarine T. B. No. 12	Fore River Shipbuilding Co.	16.5	23.1

The Donald Steamship Co., of New York, has voted to increase the capital preferred stock from \$200,000 to \$500,000, and the common stock from \$100,000 to \$250,000. The purpose is to pay for two new ships now being constructed for the company by Swan & Hunter, Newcastle-on-Tyne, England.

The City of Tampico of the Mexican-American Steamship Co.'s fleet to New Orleans, has just arrived in this country from the hands of her builders in Norway. The new steamer is 270 ft. over all, 37 ft. beam and 18 ft. draught. She is intended for service to Mexican and Central American points.

### NAVAL ARCHITECTS AND MARINE ENGINEERS

The thirteenth general meeting of the Society of Naval Architects and Marine Engineers will be held at No. 12 West Thirty-first street, New York, on Nov. 16 and 17. In addition to the program of subjects given below, Mr. Clinton H. Crane and Naval Constructor H. G. Gillmor will both have papers, though their subjects are not yet announced:

Investigations Relating to the Action of Screw Propellers. By Prof. Wm. F. Durand, member of council.

Progressive Speed Trials of Gasoline Launch Ludo. By George Crouse Cook, member.

Some Results of Tests of Model Propellers. By Messrs. A. V. Curtis and L. F. Hewins, Juniors.

Experiments With Ventilating Fans and Pipes. By Naval Constructor D. W. Taylor, U. S. N., member of council.

Notes on the Strength of Water-tight Bulkheads for Battleships and Cruisers. By Harold F. Norton, associate.

A Tale from Japan. By Mr. George W. Dickie, member of council.

Marine Steam Turbine Developments. By Mr. E. M. Speakman, associate.

Some Problems in Ferry Boat Propulsion. By Colonel E. A. Stevens, vice president.

The Ultima, a Globuloid Naval Battery. By Anson Phelps Stokes, associate.

The Cruiser. By Commander Wm. Hovgaard, member.

Scantling Regulation in Yachting. By W. P. Stephens, associate.

Some Notes on Steam Boiler Troubles. By Horace Sec, member of council.

Yacht Races. By Paul Eve Stevenson, Esq.

Shipbuilding of the Great Lakes. By W. I. Babcock, member of council.

Marine Turbines. By Charles G. Curtis, member.

### UPPER MISSISSIPPI IMPROVEMENT

Ninety delegates representing the states of Wisconsin, Minnesota, Iowa, Illinois and Missouri and fifty cities and towns on the river between Minneapolis and Cairo were in attendance when the annual convention of the Upper Mississippi River Improvement association was called to order this week. President Thomas Wilkinson of Burlington, Ia., and Secretary B. Boswell of Quincy, Ill., submitted their reports and the discussion of them occupied the greater part of the first session. The most important feature of the president's address was the report of the government engineers, who have estimated under an act passed by the last congress the cost of deepening the channel of the upper river to a depth of 6 ft. in low water. This report showed that the work would cost \$19,860,348, and that the amount could be expended under the continuous contract system during a period of years.

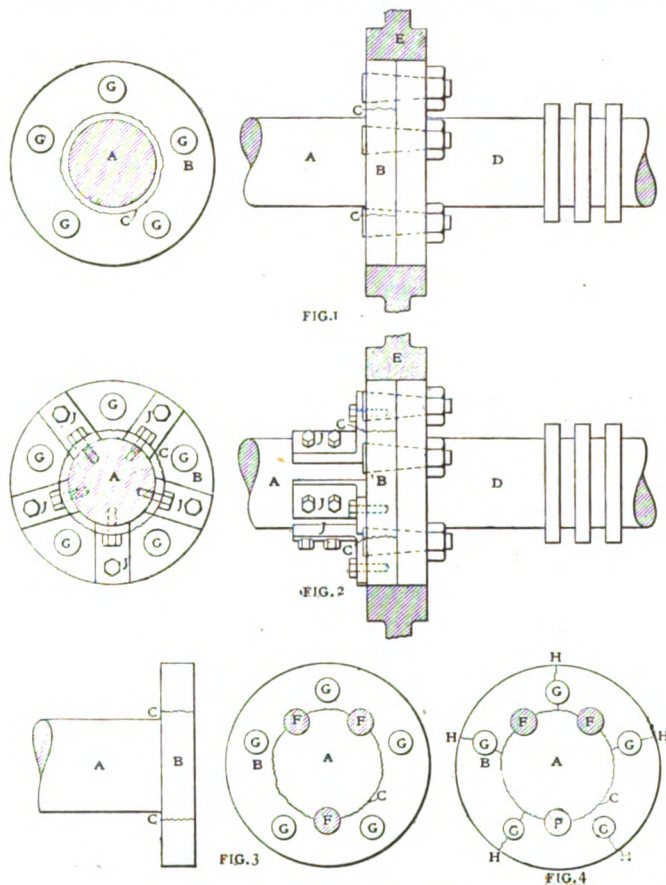
It is understood that the average daily movement over the Pittsburg terminals, known as the interchange movement, is now holding up at the average of 6,000 cars a day. The movement is greater than has ever been known. The money which has been expended at Pittsburg in improving the terminals during the past three years is now reaping its reward. The railways are handling the business magnificently though they could use more cars if they had them. Shippers are asking for from five to 100 cars a day and it is understood that at the Jones & Laughlin mill there are about 20,000 tons of finished steel awaiting shipment. All the railways have placed orders for cars by the thousand. The Duluth & Iron Range Railway has ordered 500 steel hopper cars and the Duluth, Messabi & Northern, 750 steel hopper cars from the Pressed Steel Car Co.



## REPAIRS TO THE STEAMER ATHOS

The following interesting article was published in the Sept. 21 issue of the *American Machinist*:

I wonder how many of the readers of the *American Machinist*, after reading of the misfortunes of the *Athos* (the fruit steamer which was towed into port recently 14 days overdue), have any idea of the strenuous life led by the engineers of such a boat. The round trip, voyage in and voyage out—except when a godsend in the way of a break-down gives them a few weeks in port—is monotonously the same. Twenty-four hours suffices to discharge the cargo in New York. As soon as the cargo is out, off she



THE BROKEN SHAFT AND THE REPAIRS.

steams to Jamaica. Arriving at Port Antonio the negro stevedores are taken on board and away she goes round the coast picking up cargo here and there, then back to Port Antonio, where the stevedores go ashore. From the time she takes the stevedores on till she discharges them again, 12 to 15 hours later, she has called in at and received cargo from as many as 10 different ports, with the engines working most of the time and steam up all the time. This loading is done at night, as the bananas are cut during the day. The only time that any repairs can be made is during the 24 hours in port in the United States.

The engines of the *Athos* are triple expansion, their size is immaterial to this story; suffice it to say that they are—although the average landsman would not notice it—a trifle smaller than the engine room in which they are installed. The back ends of the boilers are separated from the engine-room by a thin layer of boiler covering only. The high and intermediate cylinders are equipped with Hackworth's single eccentric valve gear. On the bases of the forward and middle column, brackets are secured, which are a part of the Hackworth valve motion. The low-pressure cylinder is equipped with the ordinary Stephenson link motion.

Homeward bound from Port Antonio the forward or

high-pressure eccentric strap broke; this carried away the two brackets on the base of the forward column. There was no spare eccentric strap and so it was decided to blank off the high-pressure cylinder and run compound with the intermediate and low-pressure cylinders. As part of the intermediate valve gear worked in one of the broken brackets, the bracket was shored in place and the *Athos* proceeded on her way under reduced steam. They were hardly started before the after coupling on the crankshaft gave way. C at Fig. 1 shows the location of the failure, which I venture to say is probably without a parallel.

A is the after end of the crankshaft and D the forward end of the thrust shaft. E is a section of the hub of the turning gear. The turning gear is a worm wheel securely keyed on the two flange couplings of the crank and thrust shafts; by throwing a worm into gear with it the engines may be turned to any desired position and held there, when making repairs. When the crack occurred at C the shaft A turned in the flange B; the thrust shaft D, with the attached coupling flange B, gradually coming to a standstill, as the ship lost way. As soon as steam was shut off, the repair shown in Fig. 2 was made. It consisted of five brackets J secured to the shaft A and flange B—between the coupling bolts G—by means of cap-screws  $1\frac{1}{4}$  inches diameter. This repair held for about half an hour.

The fine repair, shown at Fig. 3, was then made. The thrust shaft was disconnected and lifted out of the way. Three 3-inch holes were drilled at F, half in A and half in B. Three pins were driven tight in these holes and cut off flush. The thrust shaft was then put back in place, the coupling bolts put in and the turning gear E put back in place on the flanges. The key of the turning gear was driven up with a heavy sledge and the job was finished. This time she steamed 250 miles. About 12:30 one afternoon, while the donkeyman was below—relieving the engineer so that he could get his dinner—the turning gear, which was supposed to be immovable, slipped off and the next instant the coupling flange B fell in five pieces, cracked through the bolt-holes G, as shown at H, Fig. 4.

Six days and six nights in the stifling heat of the engine-room, with hardly any rest, the engineers of the *Athos* worked away at the repairs only to have them fail one after the other. But men like these make the merchant marine what it is. With few tools,—a ratchet brace, hammer, chisel and forge—and an unlimited supply of energy and know how, they do things that the average landsman or their brethren in the navy would deem impossible. It is safe to say that but for the slipping of the turning gear when it did, the *Athos* would have come into port under her own steam.

DIXIE.

News comes from Vienna that the large English ship building company of Messrs. Swan, Hunter, Wigham and Richardson, of Newcastle-on-Tyne, is arranging to purchase the greater part of the ship building yard of the Austrian Lloyd at Trieste. The purchase is to be completed after the conclusion of a new contract between Lloyds and the Austrian authorities. This is one of the firms at present engaged in the building of the latest Cunarders, the other firm sharing the work being Messrs. John Brown & Co., Clydebank. These vessels will be the largest in the world, having a length of 785 ft. and a carrying capacity of 30,000 tons. The forgings for these, including the stern frames and the rudders are being made by the Darlington Forge Co., which is also engaged upon the engine forgings and shafting for a number of large British battleships in course of construction.



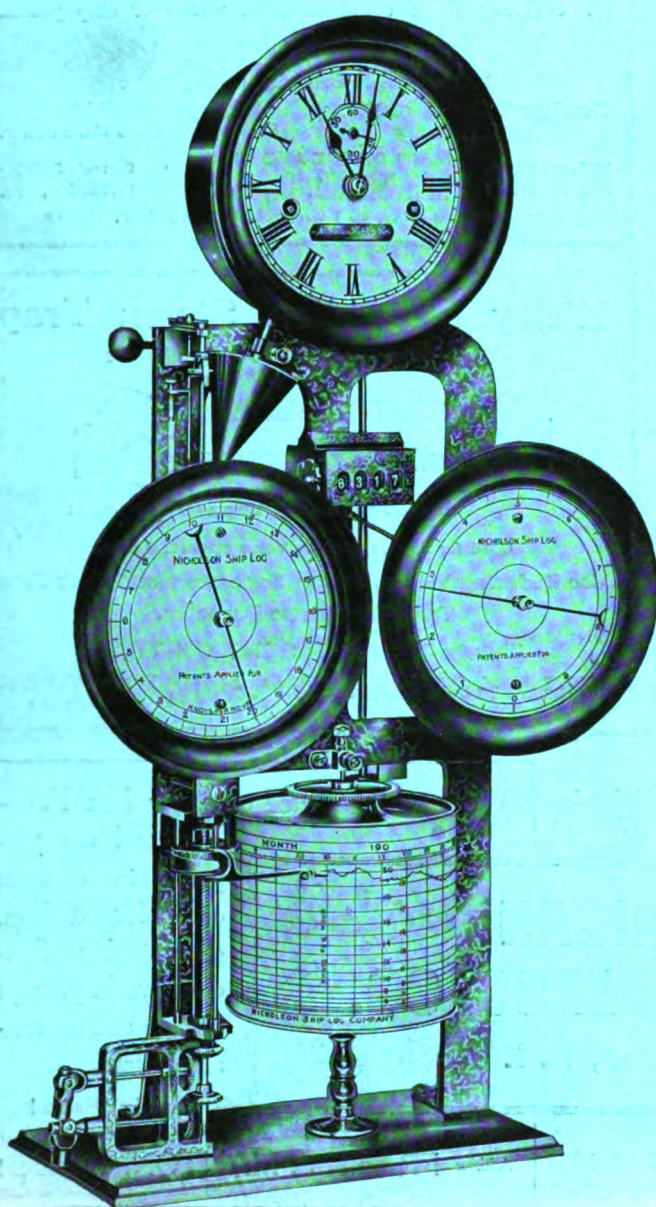


VOL. XXXII.

CLEVELAND, OCTOBER 12, 1905.

No. 15.

## The Perfected Ship Log



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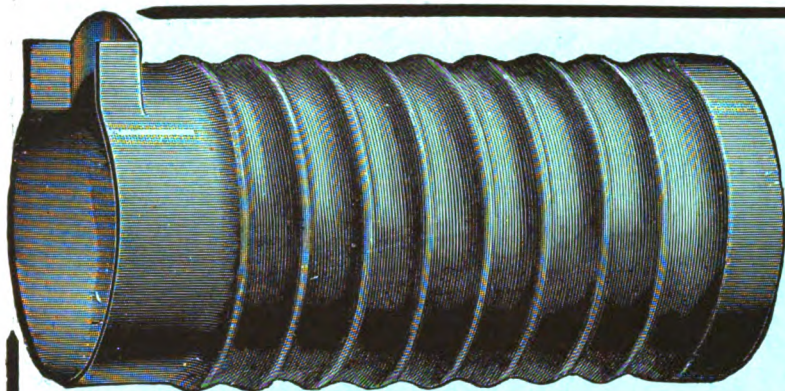
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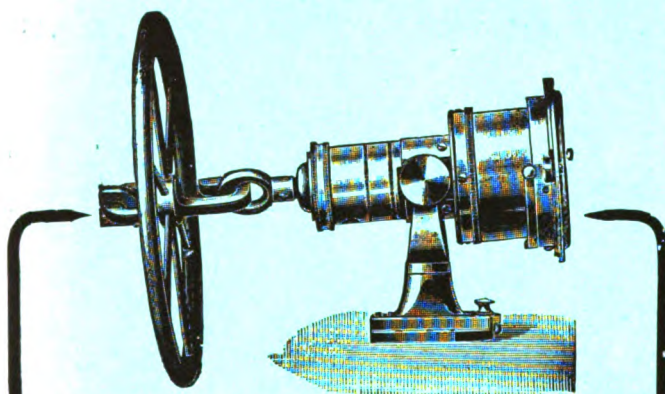
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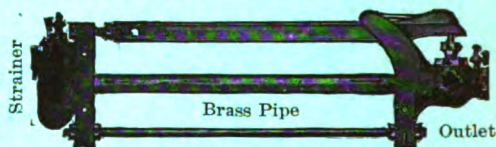
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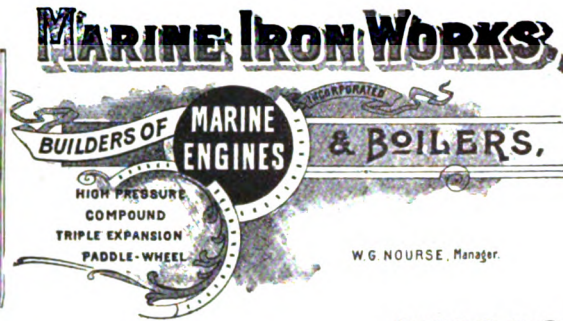
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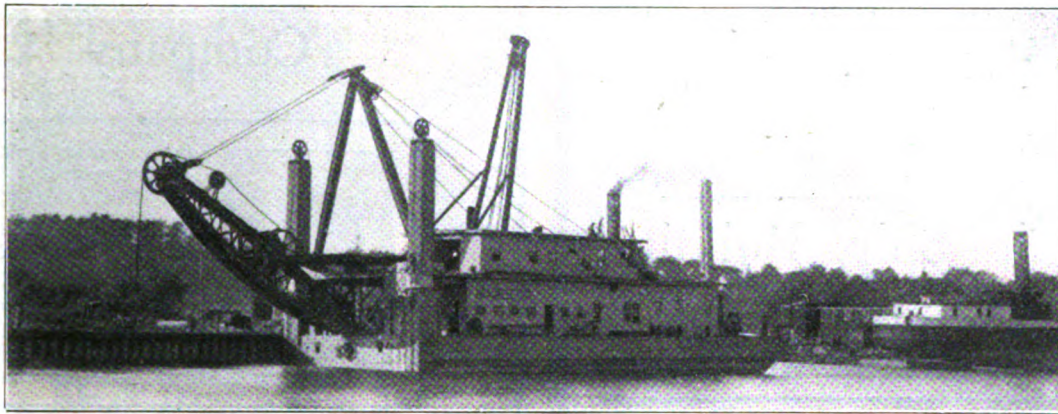


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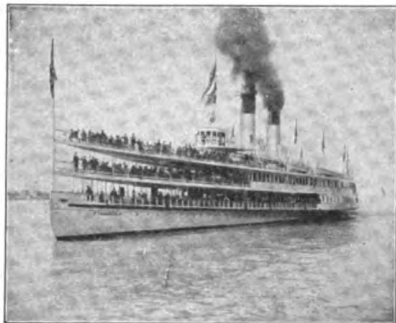
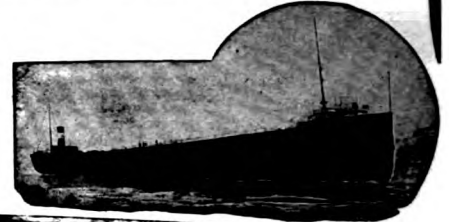
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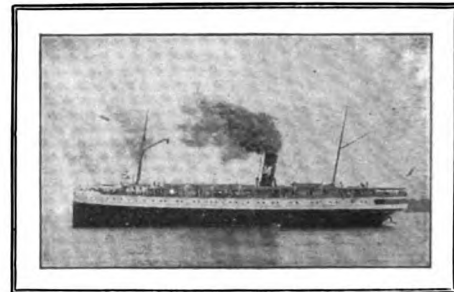
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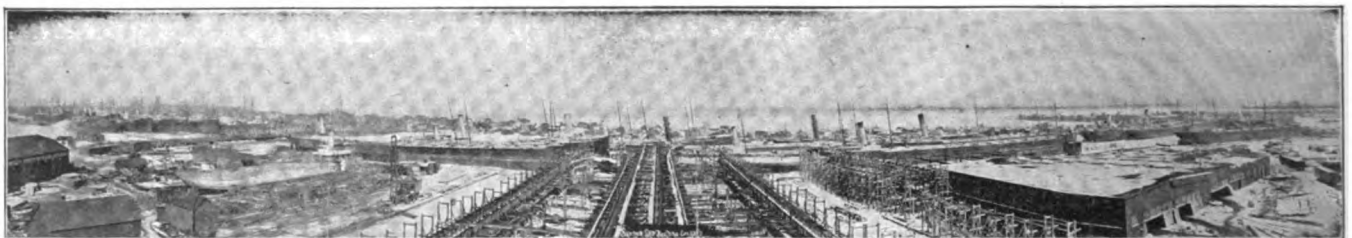


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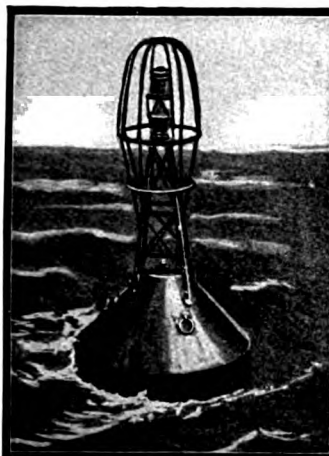
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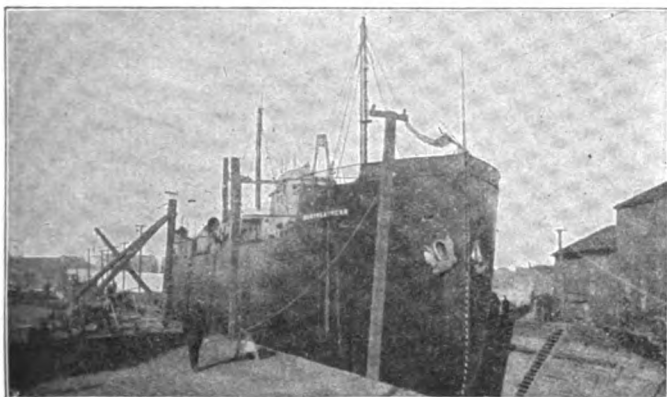
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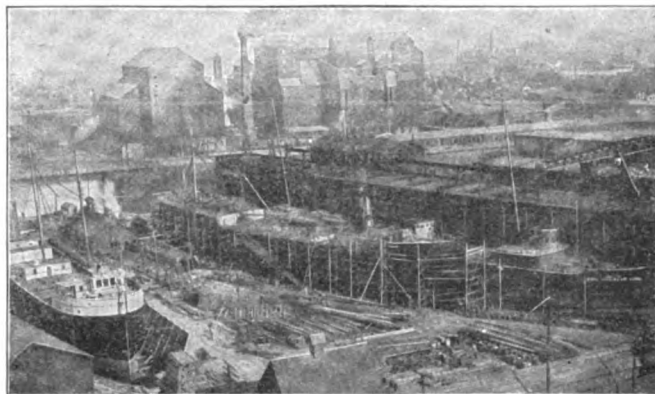
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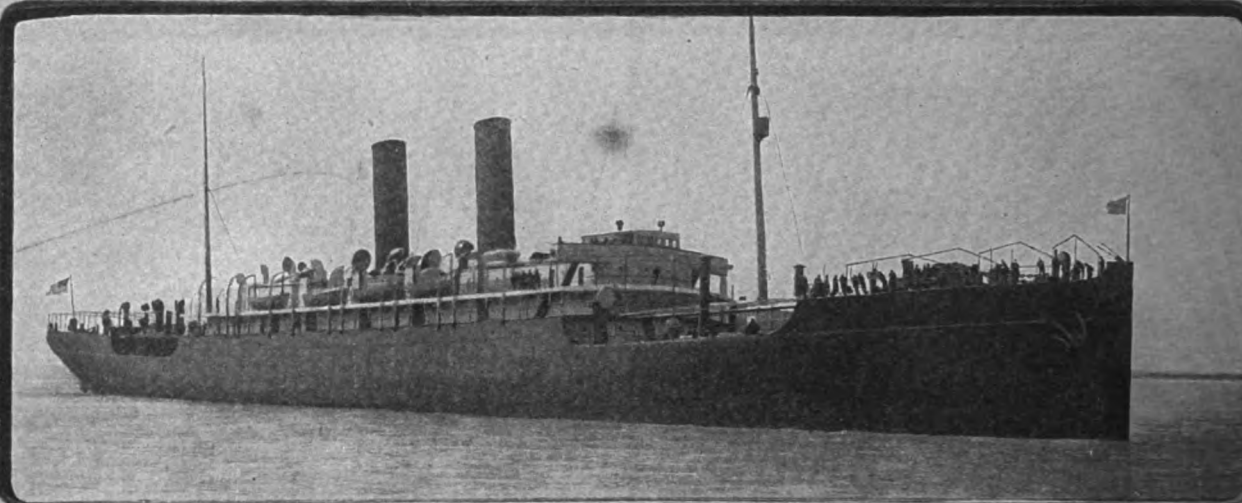
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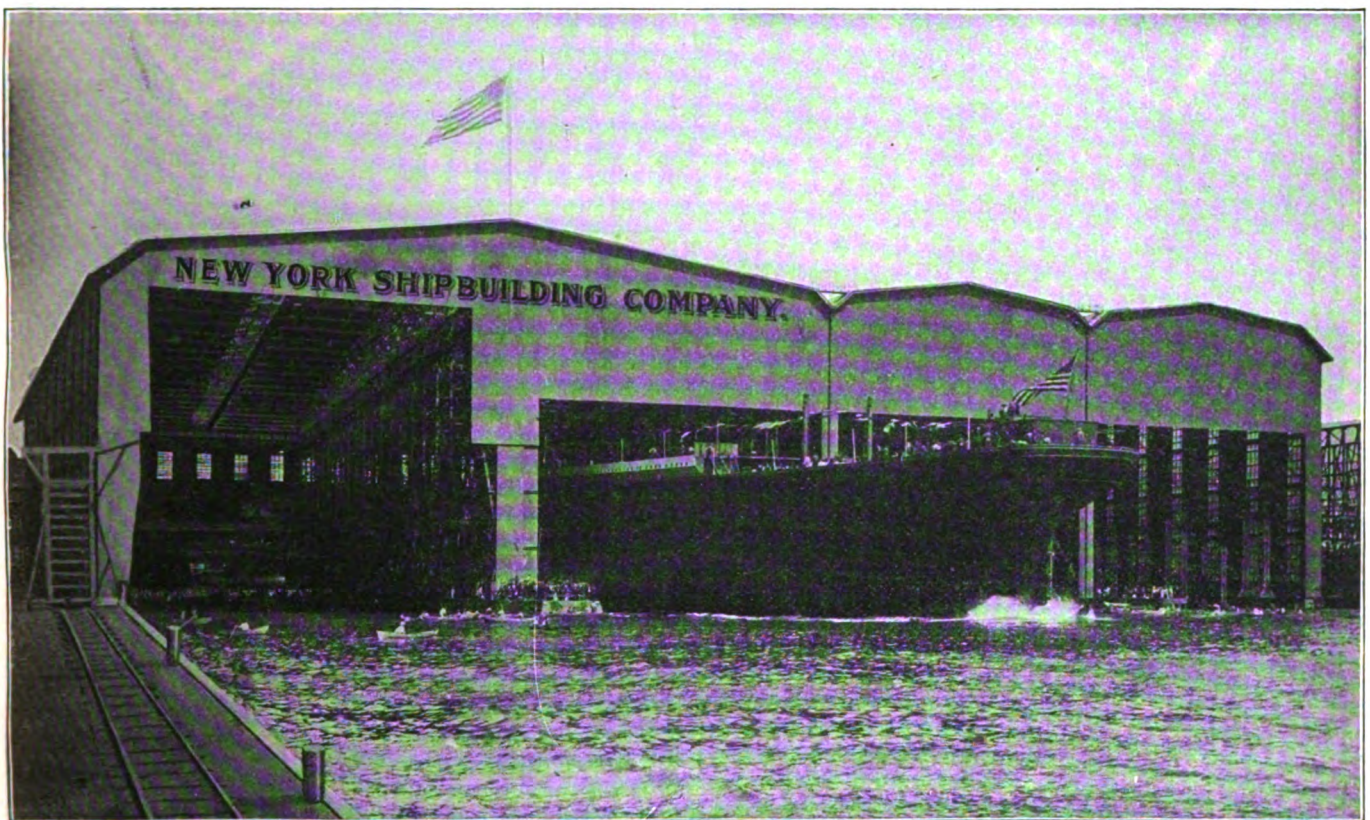
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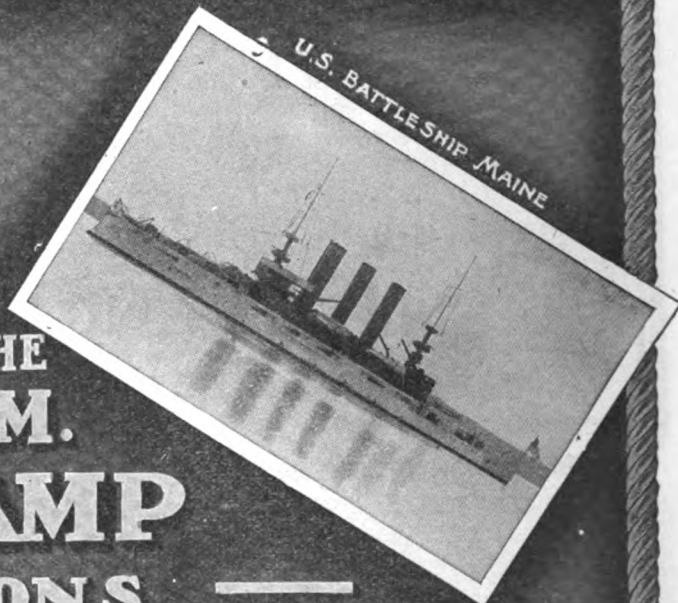
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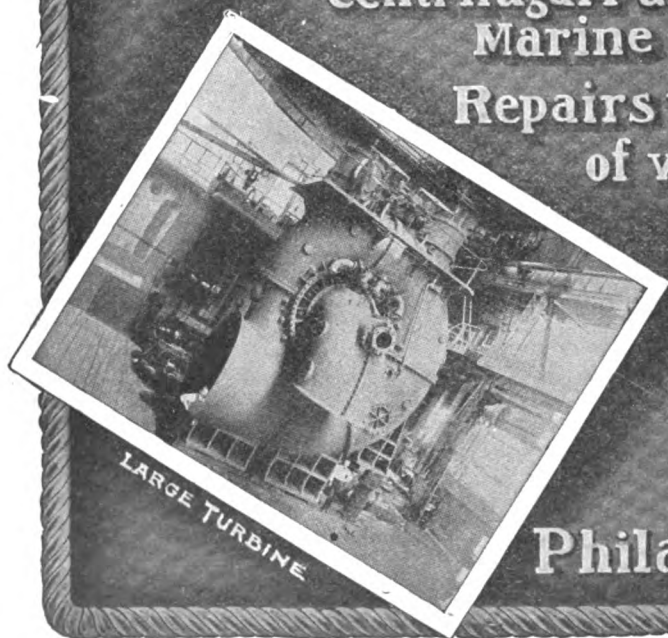
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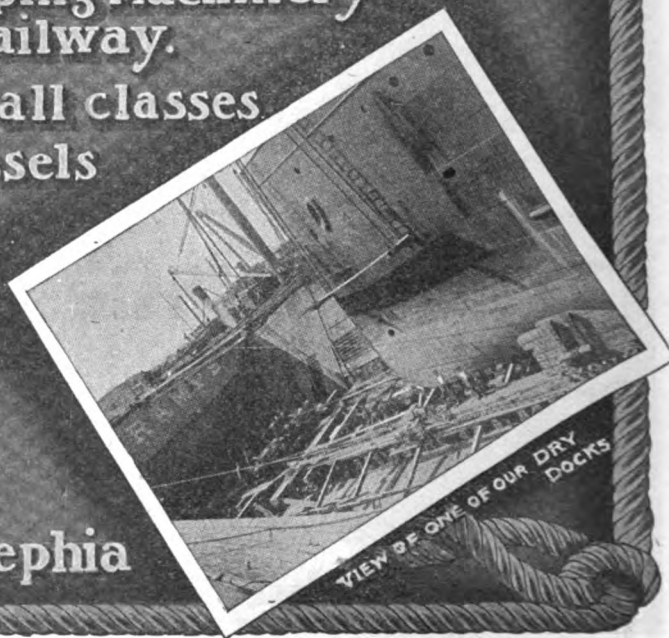
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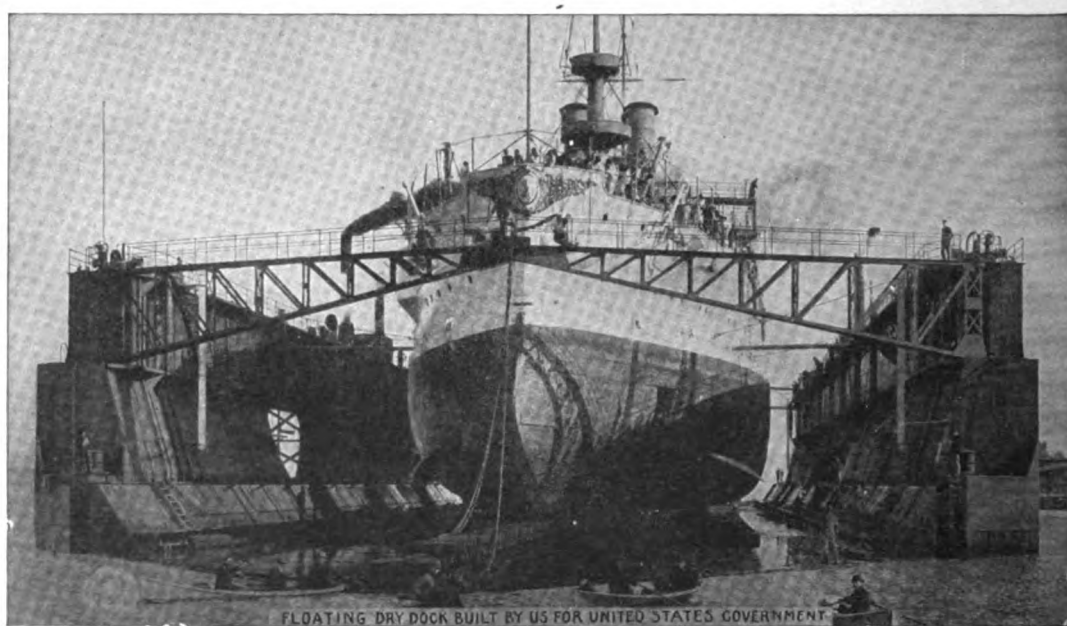
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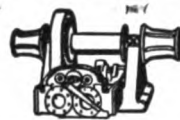
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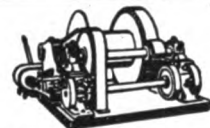
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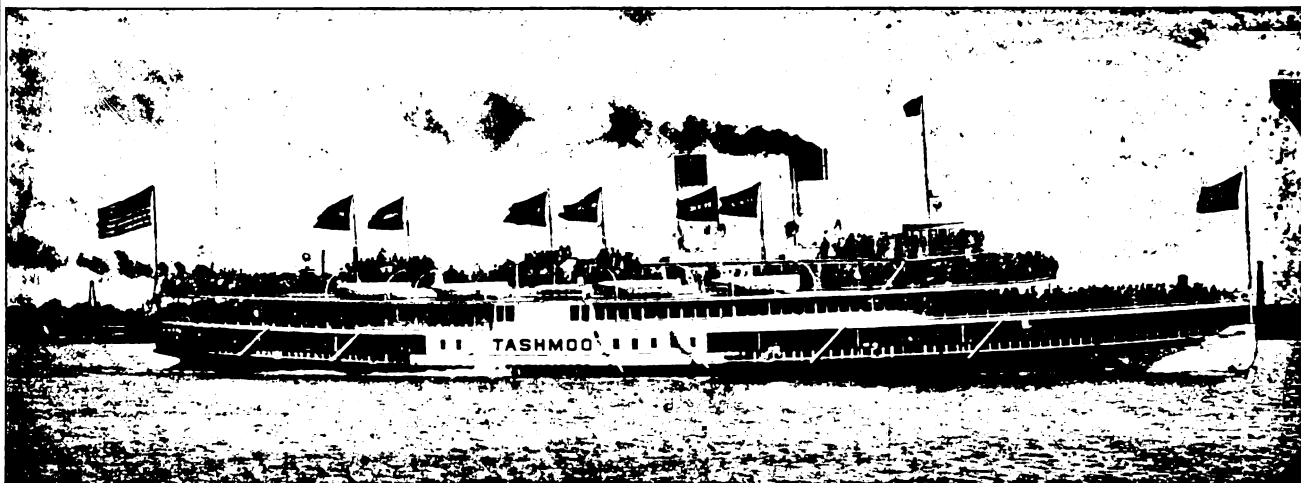
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barge.)  
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Islander. (Thousand Islands—Three Views).  
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Lagonda discharging coal at docks.  
Lackawanna.  
Maboning.  
Manitou.  
Majestic. (Three Views).  
Michigan Central in Detroit River. (Winter).  
Mohawk.  
Montana.  
W. B. Morley, wreck in Detroit River, Aug. 6, 1899.  
Simon J. Murphy. (On the Ways).

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Simon J. Murphy, Launch. (Bow in Slip. Stern not yet in Water.)  
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Rube, Richards, in Ship Canal at Duluth.  
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George Stone.  
Superior. (Steel Trust Tender).  
Tashmoo. (In Dewey Naval Parade, Detroit River).  
Tashmoo, June 9, 1900.  
Tashmoo. (Entering St. Clair Flats Ship Canal).  
Tashmoo. (Landing at Star Island—Two Views).  
Thompson, A. D. (Whaleback).  
Toronto. (Thousand Islands).  
Toronto. (Thousand Islands— at Alexandria Bay).  
Toronto. (Thousand Islands— at Gananoque).  
Transport, in Detroit River, Winter. (Car Ferry—Two Views).  
Troy.  
Uganda, in Ship Canal at Duluth.  
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MACKINAC, MICH.  
Str. North Land at the Dock.

SAULT STE. MARIE, MICH.  
Loading a Big Steamer.  
Locks showing high and low level.  
The Locks.  
General View of Locks from Office.  
Poe Lock, from below, closed.  
Poe Lock, from below, open.  
Poe Lock, from above.  
Poe Lock, with Whaleback.  
Whaleback Str. Pathfinder in the Locks.  
St. Marys River, South from the Locks.  
Weitzel Lock, from above.  
Weitzel Lock, from below.  
Str. North Land Passing Locks, two views.  
Upper Entrance to Lock Canal.  
Gate Mechanism.  
Interior of Power House.  
Canadian Lock from Upper End.  
Canadian Lock from Lower End.  
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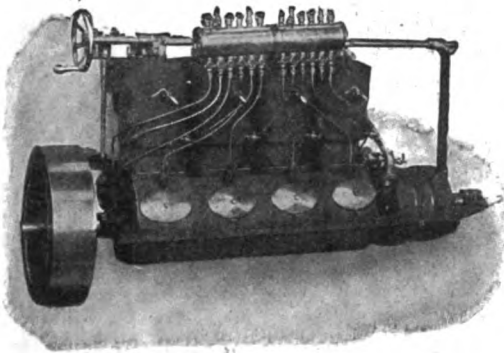
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Made to withstand the most severe and continuous service. A practical design characterized by the accessibility, compactness and simple ignition, gas producing and oiling features. Perfect control.

Four cycle type two and four cylinders, from 8 to 65 H. P. Smaller sizes of the two cycle type.

Catalogue and copy of The Launch for the asking.

Department 46.

**Truscott Boat Mfg. Co.**

**ST. JOSEPH, MICHIGAN.**

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L. E. Marshall, of the Hall Safe Co., of New York, is one of the most successful export men in the country. He has chosen the reasons for the success and failure of different export campaigns as the text of an important article in the October 1 issue of

### AMERICAN INDUSTRIES,

Official Organ of the National Association of Manufacturers.

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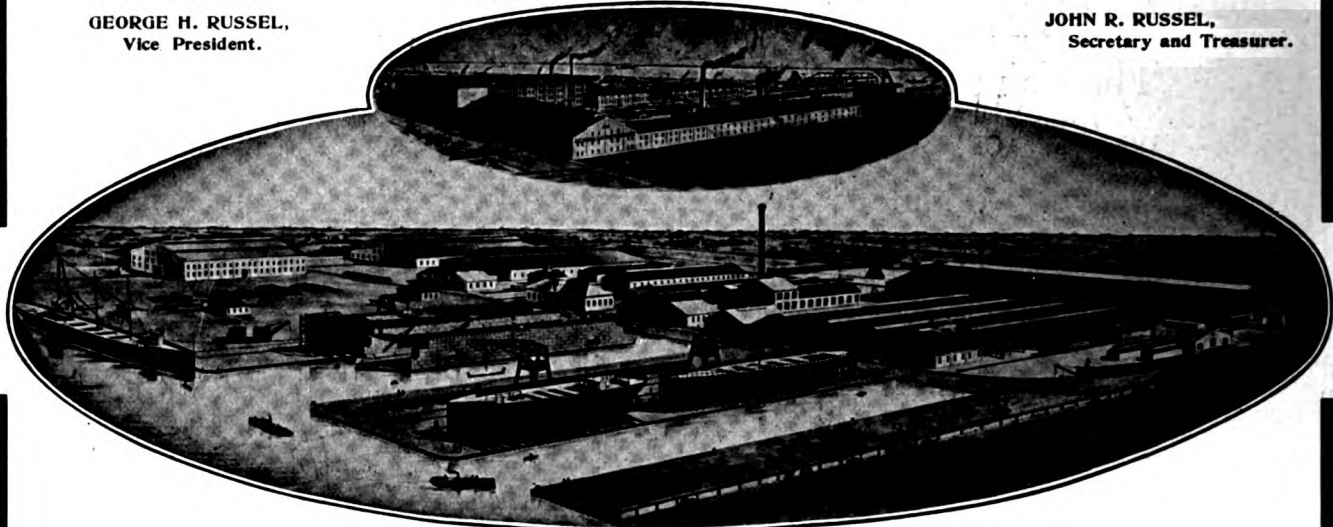
# GREAT LAKES ENGINEERING WORKS

**DETROIT, MICH.**

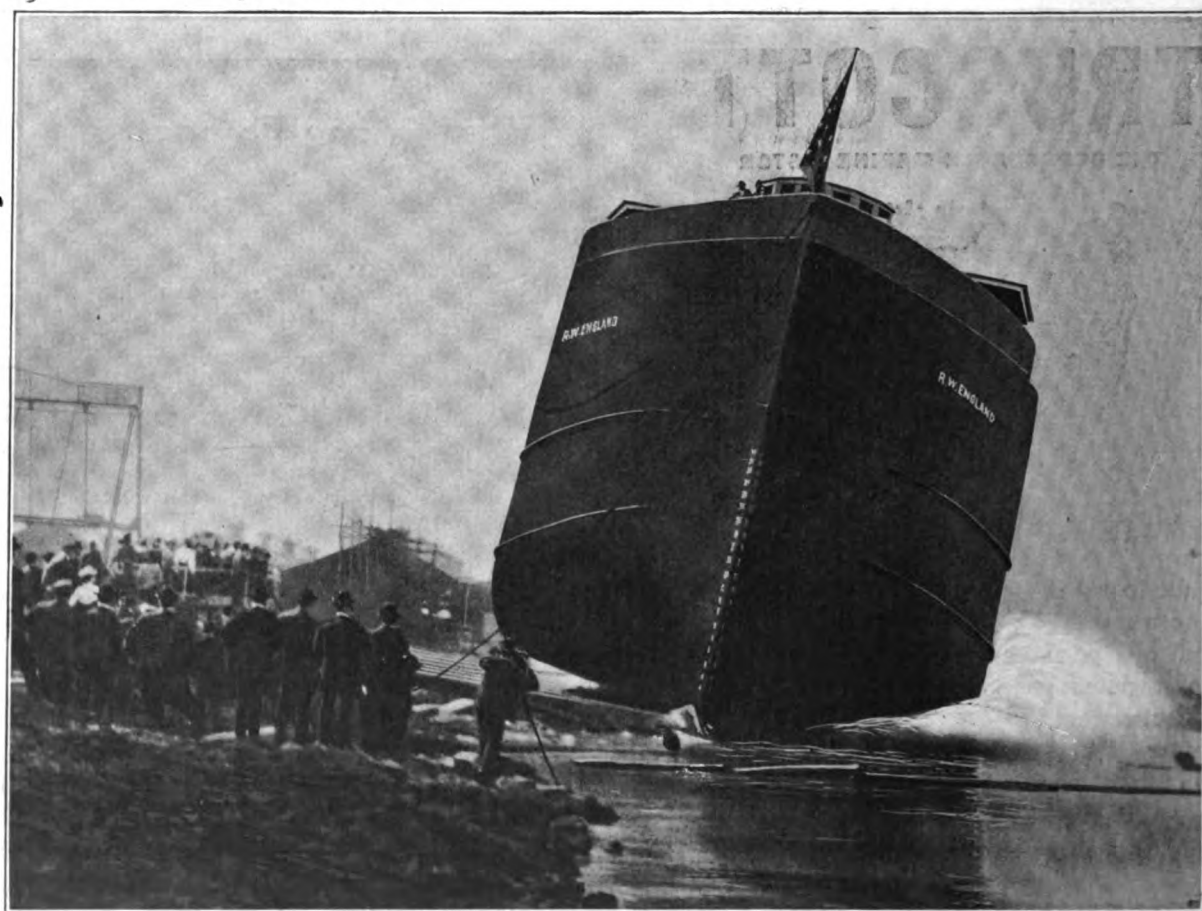
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Vice President.

JOHN R. RUSSEL,  
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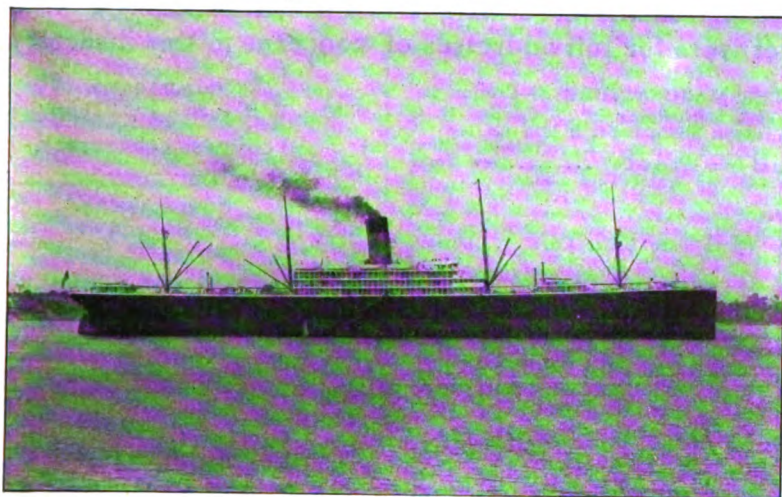
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**Marine Repairs a Specialty.**



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Steamship Minnesota equipped with Hyde Windlass and Capstans.

Selected for the Minnesota and Dakota of the Great Northern Steamship Co.'s fleet—the largest vessels ever built in the United States. They are also being installed on nearly all of the vessels now building for the Navy Department, Revenue Cutter service, Lighthouse Board and the United States Coast Survey.

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*Send for Illustrated Catalog.*

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CHICAGO ILLINOIS

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**HULLS and CARGOES**

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AMERICAN AND FOREIGN UNDERWRITERS

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**ANGLES BEAMS**  
**CHANNELS**  
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IRON STEEL  
PIG IRON  
COKE  
Cleveland, Ohio.



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**Cam Lever Pop Safety Valves  
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Steam Gauges.**

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# Buyers' Directory of the Marine Trade

For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by The Marine Review, Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

**AIR COMPRESSORS, AIR HOISTS, ETC.**  
Great Lakes Engineering Works.....Detroit.  
Mietz, Aug. ....New York.

**AIR PORTS, DEAD LIGHTS, ETC.**  
Marine Mfg. & Supply Co.....New York.

**AIR PUMPS AND APPLIANCES.**  
Fore River Ship & Engine Co., Quincy, Mass.  
Great Lakes Engineering Works.....Detroit.

**ANCHORS.**  
Bowers, L. M. & Co.....Binghamton, N. Y.

**ANTI-FRICTION METALS.**  
Cramp, Wm. & Sons.....Philadelphia.

**ARTIFICIAL DRAFT FOR BOILERS.**  
American Ship Building Co.....Cleveland.  
Detroit Ship Building Co.....Detroit.  
Great Lakes Engineering Works.....Detroit.  
Sturtevant, B. F., Co.....Hyde Park, Mass.

**ASH EJECTORS.**  
Great Lakes Engineering Works.....Detroit.

**ATTORNEYS AND PROCTORS IN ADMIRALTY.**

Gilchrist, Albert J.....Cleveland.  
Goulder, Holding & Masten.....Cleveland.  
Hoyt, Dustin & Kelley.....Cleveland.  
Jenkins, Russell & Eichelberger.....Cleveland.  
Kremer, C. E.....Chicago.  
MacDonald, Ray G.....Chicago.  
Shaw, Warren, Cady & Oakes.....Detroit.  
White, Johnson, McCaslin & Cannon Cleveland

**BAROMETERS, MARINE GLASSES, ETC.**  
Ritchie, E. S. & Sons.....Brookline, Mass.

**BLOCKS, SHEAVES, ETC.**  
Boston & Lockport Block Co.....Boston, Mass.  
Cleveland Block Co.....Cleveland.

**BLOWERS.**  
Power Specialty Co.....Detroit.  
Sturtevant, B. F. Co.....Hyde Park, Mass.

**BOAT BUILDERS.**  
Drein, Thos. & Son.....Wilmington, Del.  
Kahnweiler's Sons, David.....New York.  
Lane & DeGroot.....Long Island City, N. Y.  
Marine Construction & D. D. Co.....  
.....Mariner's Harbor, S. I., N. Y.  
Truscott Boat Mfg. Co.....St. Joseph, Mich.  
Willard, Chas. P. & Co. Winthrop Harbor, Ill.

**BOILER CLEANING DEVICE.**  
Power Specialty Co.....Detroit.

**BOILER COMPOUNDS.**  
Dearborn Drug & Chemical Works....Chicago.

**BOILER MANUFACTURERS.**  
Almy Water Tube Boiler Co., Providence, R. I.  
American Ship Building Co.....Cleveland.  
Atlantic Works.....East Boston, Mass.  
Chicago Ship Building Co.....Chicago.  
Cramp, Wm. & Sons.....Philadelphia.  
Dearing Water Tube Boiler Co.....Detroit.  
DeLauney, Belleville & Co., St. Denis, France.  
Detroit Ship Building Co.....Detroit.  
East End Boiler Works.....Detroit.  
Fletcher, W. A. & Co.....Hoboken, N. J.  
Fore River Shipbuilding Co.....Quincy, Mass.  
Great Lakes Engineering Works.....Detroit.  
Kingsford Foundry & Machine Works.....  
.....Oswego, N. Y.  
Marine Iron Works.....Chicago.  
Maryland Steel Co.....Sparrows Point, Md.  
Milwaukee Dry Dock Co.....Milwaukee.  
Musher Water Tube Boiler Co.....New York.  
Newport News Ship Building Co.....  
.....Newport News, Va.

**BOILER MANUFACTURERS—Continued.**  
New York Shipbuilding Co.....Camden, N. J.  
Northwestern Steam Boiler & Mfg. Co.....  
.....Duluth, Minn.  
Quintard Iron Works Co.....New York.  
Roberts Safety Water Tube Boiler Co.....  
.....New York.  
Stirling, The Co.....New York.  
Superior Ship Building Co.....Superior, Wis.  
Taylor Water Tube Boiler Co.....Detroit.

**BOILER RIVETS.**  
Bourne-Fuller Co.....Cleveland.

**BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.**  
Falls Hollow Staybolt Co., Cuyahoga Falls, O.

**BRASS AND BRONZE CASTINGS.**  
Cramp, Wm. & Sons.....Philadelphia.  
Fore River Ship & Engine Co., Quincy, Mass.  
Great Lakes Engineering Works.....Detroit.  
Lunkenheimer Co.....Cincinnati.  
Macbeth Iron Co.....Cleveland.

**BRIDGES, BUILDERS OF.**  
Cowing, John P.....Cleveland.  
Scherzer Rolling Lift Bridge Co.....Chicago.

**BUCKETS, ORE AND COAL.**  
Brown Hoisting & Conveying Machine Co.....  
.....Cleveland.  
McMyler Mfg. Co.....Cleveland.

**BULKHEAD DOORS, WATERTIGHT.**  
"Long Arm" System Co.....Cleveland.

**CABIN AND CABINET FINISHING WOODS.**  
Martin-Barriss Co.....Cleveland.

**CANVAS SPECIALTIES.**  
Baker & Co., H. H.....Buffalo.  
Bunker, E. A.....New York.  
Upson-Walton Co.....Cleveland.

**CAPSTANS.**  
American Ship Windlass Co., Providence, R. I.  
Hyde Windlass Co.....Bath, Me.  
Marine Mfg. & Supply Co.....New York.

**CEMENT, IRON FOR REPAIRING LEAKS.**  
Smooth-On Mfg. Co.....Jersey City, N. J.

**CHAINS.**  
Woodhouse Chain Works.....Trenton, N. J.

**CHAIN CONVEYORS, HOISTS.**  
Brown Hoisting Machinery Co. (Inc.)....  
.....Cleveland.  
General Electric Co.....Schenectady, N. Y.

**CHAIN HOISTS.**  
Boston & Lockport Block Co.....Boston, Mass.

**CHARTS.**  
Penton Publishing Co.....Cleveland.  
Potter, J. D.....London.

**CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.**  
Ashton Valve Co.....Boston.  
Ritchie, E. S. & Sons.....Brookline, Mass.

**COAL PRODUCERS AND SHIPPERS.**  
Hanna, M. A. & Co.....Cleveland.  
Ironville Dock & Coal Co.....Toledo, O.  
Pickands, Mather & Co.....Cleveland.  
Pittsburg Coal Co.....Cleveland.

**COAL AND ORE HANDLING MACHINERY.**  
Brown Hoisting Machinery Co. (Inc.)....  
.....Cleveland.  
McMyler Mfg. Co.....Cleveland.

**COMPASSES.**  
Ritchie, E. S. & Sons.....Brookline, Mass.

**COMPASS CORRECTORS.**  
How, Benj. V.....Boston.

**CONDENSERS.**  
Great Lakes Engineering Works.....Detroit.  
Thropp & Sons Co., John E.....Trenton, N. J.

**CONTRACTORS FOR PUBLIC WORKS.**  
Breyman & Bros., G. H.....Toledo.  
Buffalo Dredging Co.....Buffalo.  
Dunbar & Sullivan Dredging Co.....Buffalo.  
Fitz-Simons & Connell Co.....Chicago.  
Great Lakes Dredge & Dock Co.....Chicago.  
Hickler Bros.....Sault Ste. Marie, Mich.  
Hubbell Co., H. W.....Saginaw, Mich.  
Lake Superior Contracting & Dredging Co.,  
.....Duluth, Minn.  
Smith Co., L. P. & J. A.....Cleveland.  
Starke Dredge & Dock Co., C. H. Milwaukee.  
Sullivan, M.....Detroit.

**CORDAGE.**  
Baker & Co., H. H.....Buffalo.  
Upson-Walton Co.....Cleveland.

**CORK JACKETS AND RINGS.**  
Armstrong Cork Co.....Pittsburg, Pa.  
Kahnweiler's Sons, D.....New York.

**CRANES, TRAVELING.**  
Brown Hoisting Machinery Co.....Cleveland.  
McMyler Mfg. Co.....Cleveland.

**DIVING APPARATUS.**  
Morse, A. J. & Son.....Boston.  
Schrader's Son, Inc., A.....New York.

**DRAFT, MECHANICAL.**  
Sturtevant Co., B. F.....Hyde Park, Mass.

**DREDGING CONTRACTORS.**  
Breyman & Bros., G. H.....Toledo.  
Buffalo Dredging Co.....Buffalo.  
Dunbar & Sullivan Dredging Co.....Buffalo.  
Fitz-Simons & Connell Co.....Chicago.  
Great Lakes Dredge & Dock Co.....Chicago.  
Hickler Bros.....Sault Ste. Marie, Mich.  
Hubbell Co., H. W.....Saginaw, Mich.  
Lake Superior Contracting & Dredging Co.,  
.....Duluth, Minn.  
Smith Co., L. P. & J. A.....Cleveland.  
Starke Dredge & Dock Co., C. H. Milwaukee.  
Sullivan, M.....Detroit.

**DREDGING MACHINERY.**  
Quintard Iron Works Co.....New York.

**DRYING APPARATUS.**  
Sturtevant, B. F. Co.....Hyde Park, Mass.

**DRY DOCKS.**  
American Ship Building Co.....Cleveland.  
Atlantic Works.....East Boston, Mass.  
Buffalo Dry Dock Co.....Buffalo.  
Chicago Ship Building Co.....Chicago.  
Craig Ship Building Co.....Toledo, O.  
Cramp, Wm. & Sons.....Philadelphia.  
Detroit Ship Building Co.....Detroit.  
Great Lakes Engineering Works.....Detroit.  
Lockwood Mfg. Co.....East Boston, Mass.  
Milwaukee Dry Dock Co.....Milwaukee.  
Newport News Ship Building Co.....  
.....Newport News, Va.  
Shipowners Dry Dock Co.....Chicago.  
Superior Ship Building Co.....Superior, Wis.  
Tietjen & Lang Dry Dock Co.....Hoboken, N. J.

**DREDGE BUILDERS.**  
Manitowoc Dry Dock Co.....Manitowoc, Wis.

**DYNAMOS.**  
General Electric Co.....Schenectady, N. Y.  
Mietz, Aug.....New York.  
Sturtevant, B. F. & Co.....Hyde Park, Mass.  
Thropp & Sons, John E.....Trenton, N. J.

**ECONOMIZERS, FUEL.**  
Sturtevant Co., B. F.....Hyde Park, Mass.

**ELECTRIC HOISTS AND CRANES.**  
General Electric Co.....Schenectady, N. Y.

**WANTED and FOR SALE Department.****FOR SALE.****THAT'S OUR BUSINESS**

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Selling,  
Chartering **BOATS.**

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**CHICAGO STEAMER EXCHANGE,**  
No. 2 Rush Street.  
Long Distance Phone Cent. 5046. **CHICAGO.**

**Good A-2 Schooner.**

FOR SALE.—Cheap for cash. Well kept up. Carries 1,400 tons of ore or coal or a million feet of lumber. Good reason for selling. Call or address 1408 Rockefeller Building, Cleveland, Ohio.

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ALONG MECHANICAL LINES ADDRESS

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WANTED. — Wooden Steamer, about 230 ft. long, 36 ft. or more beam, capable of carrying 1,200 tons on 14 ft. draught. Must have F. & A. Compound Engine, boiler on deck and be in good general repair. Address Box 85, MARINE REVIEW, Cleveland, with full description, price, etc.

WANTED TO PURCHASE.— Good steel or wooden vessel of Welland canal size. Must be in good condition and have sufficient power to enable her to tow one vessel varying fifteen hundred tons. Address Box 84, MARINE REVIEW, Cleveland.

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A set of tables showing the time required at different rates of speed, 8 to 15 miles an hour, to cover distances between all ports on the Great Lakes. A time saver to the vessel owner or vessel agent as well as captain or engineer. Send for it on approval.

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Makers of only the Highest Quality of Staybolt Material, in Hollow and Solid Bars, from the Best Double-Refined Charcoal Iron or Steel. **FALLS HOLLOW STAYBOLT IRON** is the only Reliable Flexible Staybolt in the World.

The Only Staybolt Iron which responds in service to the expansion and contraction of fire box; which relieves the material in molecular strains; which is self protective from burning; which does not make the side sheets crack; which earns its own cost in oxygen through it to the fire; always sure in giving warning of breakage.

The Staybolt which lasts longest, requires least repairs, gives longest life to the fire box, and the longest service in the engine on the rails. In use by Leading Railways of the United States, Canada, Mexico, Japan and Norway. Also by Marine Engineers and the United States Government. And by the Manufacturers of Mining Drills and by others requiring absolutely reliable material.

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TOLEDO HARBOR, TOLEDO, OHIO.

1,800 Feet of Dock.

6 McMyler Derricks.

Capacity 8,000 Tons Daily.

**Fuel Lighters.** —"KANAWHA."  
—"PENNSYLVANIA."  
—"HOCKING."

**Docks.** —"PENNSYLVANIA R. R."  
—"HOCKING VALLEY R. R."  
—"TOLEDO AND OHIO CENTRAL R. R."

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12 Pockets.

Platform.

Low Dock.

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MARINE SUPPLY COMPANY—STORE AND ICE HOUSE ON DOCK.

# Buyers' Directory of the Marine Trade.—Continued.

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General Electric Co.....Schenectady, N. Y.  
Mietz, Aug. ....New York.  
Sturtevant, B. F. & Co.....Hyde Park, Mass.  
Thropp & Sons, John E.....Trenton, N. J.

## ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.  
Atlantic Works.....East Boston, Mass.  
Chicago Ship Building Co.....Chicago.  
Chase Machine Co.....Cleveland.  
Cramp, Wm. & Sons.....Philadelphia.  
Craig Ship Building Co.....Toledo, O.  
Detroit Ship Building Co.....Detroit.  
Fletcher, W. & A. Co.....Hoboken, N. J.  
Fore River Shipbuilding Co.....Quincy, Mass.  
Great Lakes Engineering Works.....Detroit, Mich.  
Hall Bros. ....Philadelphia.  
Lockwood Mfg. Co.....East Boston, Mass.  
Marine Iron Works.....Chicago.  
Maryland Steel Co.....Sparrows Point, Md.  
Mietz, Aug. ....New York.  
Milwaukee Dry Dock Co.....Milwaukee.  
Mosher, Chas. D. ....New York.  
Moulton Steering Engine Co.....New York.  
Newport News Ship Building Co.....Newport News, Va.  
New York Shipbuilding Co.....Camden, N. J.  
Northwestern Steam Boiler & Mfg. Co.....Duluth, Mich.  
Quintard Iron Works Co.....New York.  
Roach's Ship Yard.....Chester, Pa.  
Sheriffa Mfg. Co.....Milwaukee.  
Superior Ship Building Co.....Superior, Wis.  
Thropp, J. E. & Sons Co.....Trenton, N. J.  
Trout, H. G. ....Buffalo.

## ENGINE BUILDERS, STEAM.

Sturtevant Co., B. F. ....Hyde Park, Mass.

## ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.

Cory, Chas. & Son.....New York.  
Marine Mfg. Supply Co.....New York.

## ENGINEERING SPECIALTIES AND SUPPLIES.

Crane Co. ....Chicago.  
Kieley & Mueller.....New York.  
Lunkenheimer Co. ....Cincinnati.  
Northwestern Steam Boiler & Mfg. Co.....Duluth, Minn.

## ENGINEERS, MARINE, MECHANICAL, CONSULTING.

Hynd, Alexander.....Cleveland.  
Hunt, Robt. W. & Co.....Chicago.  
Kidd, Joseph.....Duluth, Minn.  
Mosher, Chas. D. ....New York.  
Nacey, James.....Cleveland.  
Roelker, H. B. ....New York.  
Wood, W. J. ....Chicago.

## FANS FOR VENTILATION, EXHAUST, ETC.

Sturtevant, B. F. Co.....Hyde Park, Mass.

## FEED WATER PURIFIERS AND HEATERS.

Greacen-Derby Engineering Co.....Perth Amboy, N. J.  
Ross Valve Co.....Troy, N. Y.

## FIRE EXTINGUISHERS.

Safety Fire Extinguisher Co.....New York.

## FIXTURES FOR LAMPS, OIL OR ELECTRIC.

General Electric Co.....Schenectady, N. Y.

## FORGES.

Sturtevant, B. F. Co.....Boston.  
Sutton Co., C. E. ....Toledo, O.

## FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.

Cleveland City Forge & Iron Co.....Cleveland.  
Fore River Shipbuilding Co.....Quincy, Mass.  
Macbeth Iron Co.....Cleveland.

## FLUE WELDING.

Fix's, S. Sons.....Cleveland.

## FUEL ECONOMIZERS.

Sturtevant Co., B. F. ....Hyde Park, Mass.

## FUELING COMPANIES AND COAL DEALERS.

Hanna, M. A. & Co.....Cleveland.  
Ironville Dock & Coal Co.....Toledo, O.  
Parker Bros. Co., Ltd. ....Detroit.  
Pickands, Mather & Co.....Cleveland.  
Pittsburg Coal Co.....Cleveland.  
Smith, Stanley B., & Co.....Detroit.  
Smith Coal & Dock Co., Stanley B. Toledo, O.

## FURNACES FOR BOILERS.

Continental Iron Works.....New York.

## GAS BUOYS.

Safety Car Heating & Lighting Co.....New York.

## GAS AND GASOLINE ENGINES.

Chase Machine Co.....Cleveland.

## GAUGES, STEAM AND VACUUM.

Ashton Valve Co.....Boston.  
Lunkenheimer Co. ....Cincinnati.

## GAUGES, WATER.

Bonner Co., Wm. T. ....Boston.  
Lunkenheimer Co. ....Cincinnati, O.

## GENERATING SETS.

Sturtevant Co., B. F. ....Hyde Park, Mass.  
General Electric Co.....Schenectady, N. Y.

## GRAPHITE.

Dixon Crucible Co., Joseph..Jersey City, N. J.

## GREASE EXTRACTORS.

Greacen-Derby Engineering Co.....Perth Amboy, N. J.

## HAMMERS, STEAM.

Chase Machine Co.....Cleveland.

## HEATING APPARATUS.

Sturtevant, B. F. Co.....Hyde Park, Mass.  
Sutton Co., C. E. ....Toledo, O.

## HOISTS FOR CARGO, ETC.

American Ship Building Co.....Cleveland.  
Brown Hoisting Machinery Co. (Inc.).....Cleveland.  
Chase Machine Co.....Cleveland.  
General Electric Co.....New York.  
Georgian Bay Engineering Works.....Midland, Ont.  
Hyde Windlass Co.....Bath, Me.  
McMyle, Mfg. Co.....Cleveland.  
Marine Iron Co.....Bay City.  
Mietz, Aug. ....New York.

## HOLLOW SHAFTINGS, IRON OR STEEL.

Falls Hollow Staybolt Co., Cuyahoga Falls, O.

## HOLLOW STAYBOLT IRON.

Falls Hollow Staybolt Co., Cuyahoga Falls, O.

## HYDRAULIC DREDGES.

Great Lakes Engineering Works.....Detroit.

## HYDRAULIC TOOLS.

Watson-Stillman Co., The.....New York.

## ICE MACHINERY.

Great Lakes Engineering Works.....Detroit.  
Roelker, H. B. ....New York.

## INDICATORS FOR STEAM ENGINES.

Ashton Valve Co.....Boston.

## INJECTORS.

American Injector Co.....Detroit.  
Crane Co. ....Chicago.  
Jenkins Bros. ....New York.  
Lunkenheimer Co. ....Cincinnati.  
Penberthy Injector Co.....Detroit, Mich.

## INSURANCE, MARINE.

Elphicke, C. W. & Co.....Chicago.  
Fleming & Co., E. J. ....Chicago.  
Gilchrist & Co., C. P. ....Cleveland.  
Hawgood & Co., W. A. ....Cleveland.  
Helm & Co., D. T. ....Duluth.  
Hutchinson & Co.....Cleveland.  
McCarthy, T. R. ....Montreal.  
McCurdy, Geo. L. ....Chicago.  
Mitchell & Co.....Cleveland.  
Parker Bros. Co., Ltd. ....Detroit.  
Peck, Chas. E. & W. F. New York & Chicago.  
Prindiville & Co.....Chicago.  
Richardson, W. C. ....Cleveland.  
Sullivan, D. & Co.....Chicago.

## IRON CASTINGS.

Sutton Co., C. E. ....Toledo, O.

## IRON ORE AND PIG IRON.

Bourne-Fuller Co.....Cleveland, O.  
Hanna, M. A. & Co.....Cleveland.  
Pickands, Mather & Co.....Cleveland.

## LAUNCHES—STEAM, NAPHTHA, ELECTRIC.

Marine Iron Works.....Chicago.  
Truscott Boat Mfg. Co.....St. Joseph, Mich.

## LIFE PRESERVERS, LIFE BOATS, BUOYS.

Armstrong, Cork Co.....Pittsburg.  
Drein, Thos. & Son.....Wilmington, Del.  
Kahnweiler's Sons, D. ....New York.

## LIGHTS, SIDE AND SIGNAL.

Russell & Watson .....Buffalo.

## LOGS.

Nicholson Ship Log Co.....Cleveland.  
Walker & Sons, Thomas....Birmingham, Eng.  
Also Ship Chandlers.

## LUBRICATING GRAPHITE.

Dixon Crucible Co., Joseph..Jersey City, N. J.

## LUBRICATORS.

Crane Co. ....Chicago.  
Lunkenheimer Co. ....Cincinnati.

## LUMBER.

Martin-Barriss Co.....Cleveland.  
Rayner, J. ....Chicago.

## MACHINISTS.

Chase Machine Co.....Cleveland.  
Hickler Bros.....Sault Ste. Marie, Mich.  
Lockwood Mfg. Co.....East Boston, Mass.

## MACHINE TOOLS (WOOD WORKING).

Atlantic Works, Inc.....Philadelphia.

## MARINE RAILWAYS.

Hickler Bros.....Sault Ste. Marie, Mich.

## MARINE RAILWAYS, BUILDERS OF.

Crandall & Son, H. L....East Boston, Mass.

## MATTRESSES, CUSHIONS, BEDDING.

Fogg, M. W. ....New York.

## MECHANICAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.  
Detroit Ship Building Co.....Detroit.  
Great Lakes Engineering Works.....Detroit.  
Sturtevant, B. F. Co.....Hyde Park, Mass.

## METALLIC PACKING.

Katzenstein, L. & Co.....New York.

## MOTORS, GENERATORS—ELECTRIC.

General Electric Co.....Schenectady, N. Y.  
Sturtevant, B. F. Co.....Hyde Park, Mass.

## NAUTICAL INSTRUMENTS.

Ritchie, E. S., & Sons.....Brookline, Mass.

## NAVAL ARCHITECTS.

Hynd, Alexander.....Cleveland.  
Kidd, Joseph.....Duluth, Minn.  
Mosher, Chas. D. ....New York.  
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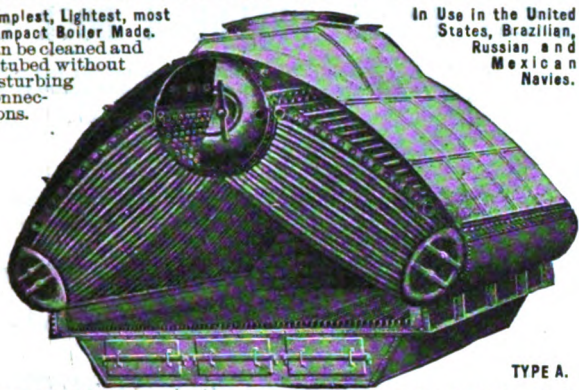
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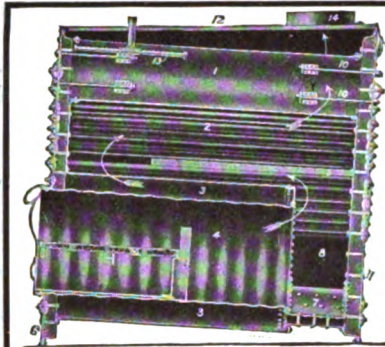
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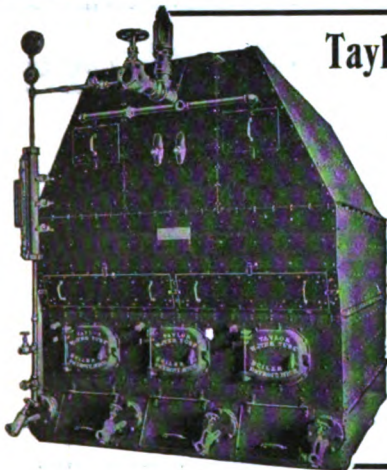
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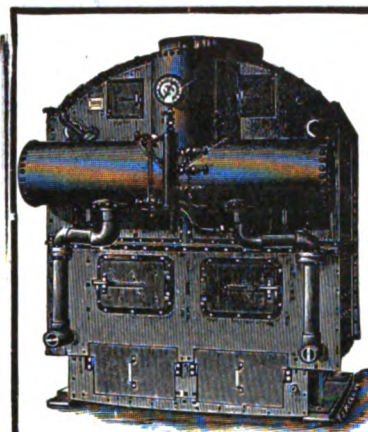
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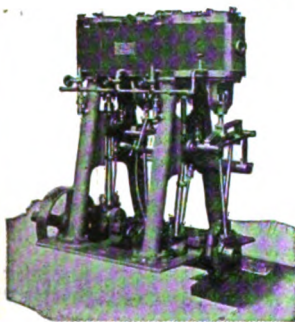
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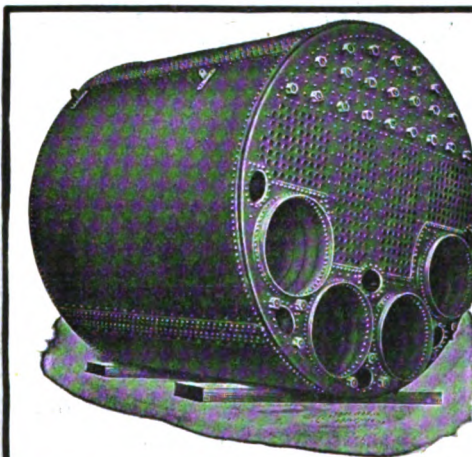
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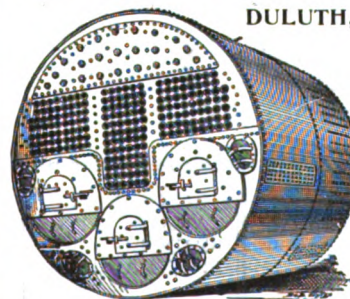
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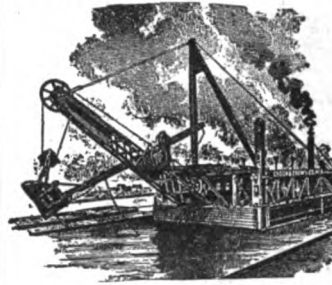
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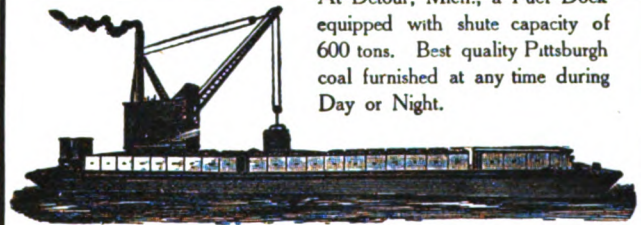
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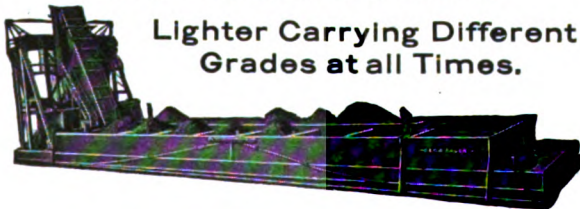
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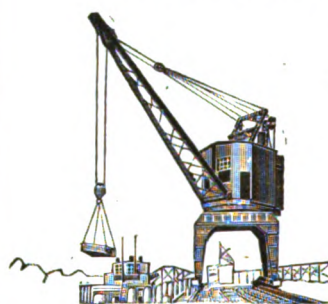
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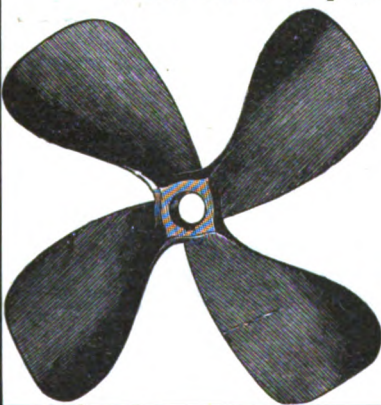
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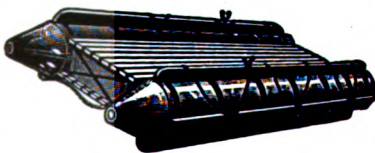
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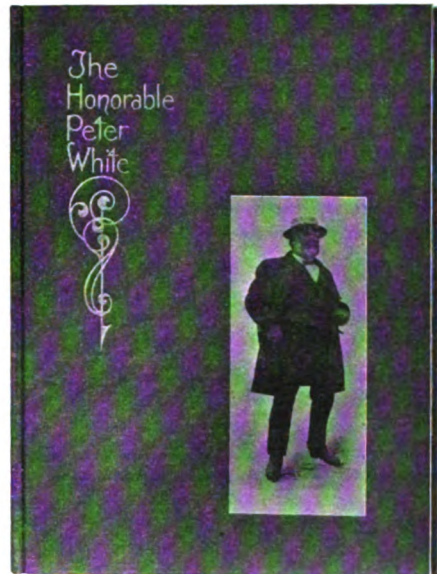
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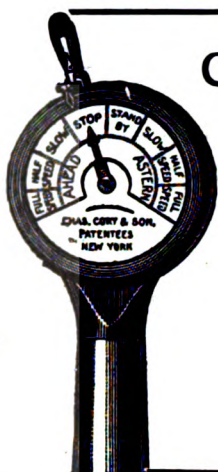
**The Work Embraces** { I.—Customs Tariffs of All Nations.  
II.—A Port Directory of the World.  
III.—Board of Trade Rules and Regulations.  
IV.—Load Line Tables, Sailing Rules, Lights, Signals.  
V.—Digest of Shipping Laws. Much other Useful Information

THE SHIPPING WORLD OFFICES, Effingham House, Arundel-street  
Strand, London, W. C.

Almy Water Tube Boiler Co.	41	East End Boiler Works.	41	Lake Superior Contracting &	42	Raynor, J.	43
American Industries.	13	Elphicke, C. W. & Co.	46	Dredging Co.	42	Red Star Line.	45
American Injector Co.	9			LeMoi's Scientifique et Industrial	43	Richardson, W. C.	46
American Line.	4	Falls Hollow Staybolt Co.	37	Lester, S. S.	46	Ritchie & Sons, E. S.	*
American Ship Building Co.	2	Fitz-Simons & Connell Co.	42	Link Belt Machinery Co.	50	Roberts Safety Water-Tube	11
American Ship Windlass Co.	2	Fix's Sons, S.	50	Lockwood Mfg. Co.	+	Boiler Co.	50
Armstrong Cork Co.	52	Fleming & Co., E. J.	46	"Long Arm" System Co.	+	Roelker, H. B.	50
Ashton Valve Co.	35	Fletcher Co., W. & A.	48	Lunkenheimer Co.	11	Ross Valve Co.	50
Atlantic Works.	48	Fogg, M. W.	50				
Atlantic Works, Inc.	†	Fore River Shipbuilding Co.	48	McCarthy, T. R.	46	Safety Car Heating & Lighting	5
				McCurdy, Geo. L.	35	Co.	5
Baker, Howard H. & Co.	52	General Electric Co.	52	McMyler Mfg. Co.	44	Safety Fire Extinguisher Co.	44
Belcher, Fred P.	46	Gilchrist, Albert J.	46	MacDonald, Ray G.	46	Scherzer Rolling Lift Bridge Co.	44
Boland, J. J.	46	Gilchrist & Co., C. P.	46	Mallory Line.	45	Schrader's Son, A.	46
Bonner & Co., Wm. T.	†	Goulder, Holding & Masten	46	Manitowoc Dry Dock Co.	3	Shaw, Warren, Cady & Oakes.	50
Boston & Lockport Block Co.	*	Great Lakes Dredge & Dock Co.	42	Marine Iron Co., Bay City, Mich.	47	Shelby Steel Tube Co.	5
Boston Steamship Co.	45	Great Lakes Engineering Works	14	Marine Iron Works	3	Sheriffs Mfg. Co.	44
Bourne-Fuller Co.	35	Great Lakes Register.	48	Marine Mfg. & Supply Co.	*	Shipping World.	49
Bowers, L. M. & Co.	41	Great Lakes Towing Co.	9	Martin-Barriss Co.	48	Shipowners' Dry Dock Co.	48
Breymann & Bros., G. H.	42	Greacen-Derby Engineering Co.	†	Maryland Steel Co.	10	Smith Co., L. P. & J. A.	43
Brown Hoisting Machinery Co., Inc.	2			Merchants' Montreal Line.	44	Smith Coal & Dock Co., Stanley B.	37
Buffalo Dredging Co.	42	Hall, John B.	46	Mietz, Aug.	5	Smith, Stanley B., & Co.	37
Buffalo Dry Dock Co.	5	Hanna & Co., M. A.	43	Milwaukee Dry Dock Co.	†	Smooth-On Mfg. Co.	51
Bunker, Edw. A.	51	Hawgood & Co., W. A.	46	Mitchell & Co.	46	Standard Oil Co.	43
		Helm & Co., D. T.	46	Morse & Son, A. J.	50	Starks Dredge & Dock Co., C. H.	43
		Hickler Bros.	42	Mosher Water-Tube Boiler Co.	41	Stirling Co.	48
		Holmes, Samuel.	46	Moulton Steering Engine Co.	50	Stratford Oakum Co., Geo.	48
Carroll Wm. F.	46	How, Benj. V.	52			Sturtevant, B. F. Co.	52
Chase Machine Co.	11	Hoyt, Dustin & Kelley.	46	Nacey & Hynd	47	Sullivan, M.	43
Chicago Ship Building Co.	4	Hubbell Co., H. W.	42	Newport News Ship Building & Dry Dock Co.	6	Sullivan & Co.	46
Cleveland & Buffalo Trans. Co.	44	Hunt & Co., Robert W.	47	New York & Cuba Mail S. S. Co.	45	Superior Ship Building Co.	4
Cleveland City Forge & Iron Co.	51	Hutchinson & Co.	46	New York Shipbuilding Co.	7	Sutton Co., C. E.	50
Continental Iron Works	2	Hyde Windlass Co.	35	Nicholson Ship Log Co.	*		
Cory, Chas. & Son.	50			Northwestern Steam Boiler & Mfg. Co.	41	Taylor Water-Tube Boiler Co.	41
Craig Ship Building Co.	*	International Mercantile Marine Co.	45	Otis Steel Co.	3	Thropp, J. E. & Sons Co.	41
Cramp, Wm. & Sons, S. & E. B. Co.	8	Ironville Coal and Dock Co.	43			Tietjen & Lang Dry Dock Co.	50
Crandall & Son, H. I.	37			Parker Bros. Co.	46	Trout, H. G.	44
Crane Co.	48	Jenkins Brothers.	52	Parsons, Ralph M.	†	Truscott Boat Mfg Co.	13
		Jenkins, Russell & Eichelberg.	46	Peck, Chas. E. & W. F.	48		
				Penberthy Injector Co.	*	United Fruit Co.	45
Dearborn Drug & Chemical Wks.	9	Kahnweiler's Sons, David.	51	Pickands, Mather & Co.	43	Upson-Walton Co.	52
Dearing Water Tube Boiler Co.	11	Katzenstein & Co., L.	51	Pittsburg Coal Co.	9		
Delaware, Belleville & Co.	35	Kidd, Joseph.	47	Potter, J. D.	47	Walker, Thomas & Son.	2
Delaware River Iron S. B. & E. Works.	51	Kieley & Mueller.	2	Power Specialty Co.	*	Ward Line.	45
Detroit Ship Building Co.	4	Kingsford Foundry & Machine Works.	41	Prindiville & Co.	46	Watson-Stillman Co.	51
Dixon Crucible Co., Joseph.	44	Kremer, C. E.	46			White, Johnson, McCaslin & Cannon.	46
Donnelly Salvage & Wrecking Co.	47			Quintard Iron Works Co.	50	Wood, W. J.	47
Drein, Thos. & Son.	42					Woodhouse Chain Works.	47
Dunbar & Sullivan Dredging Co.	42						

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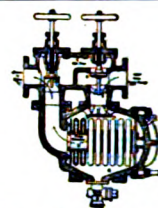
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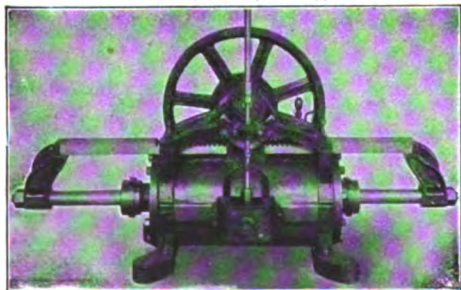
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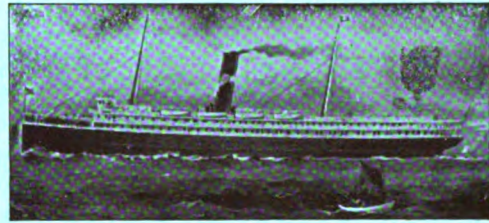
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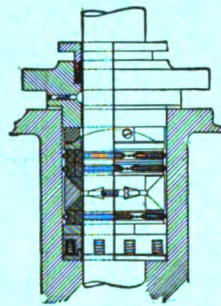
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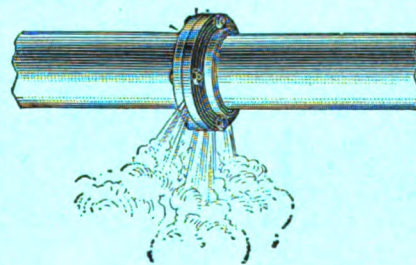
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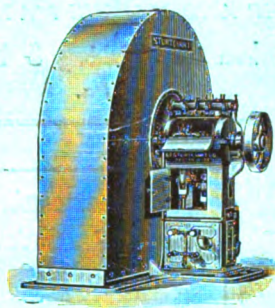
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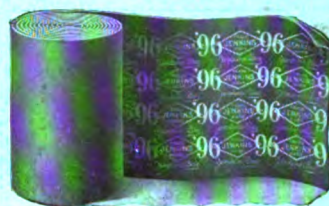
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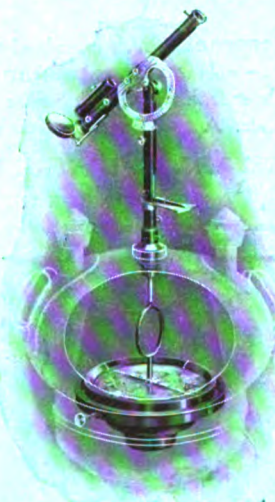
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